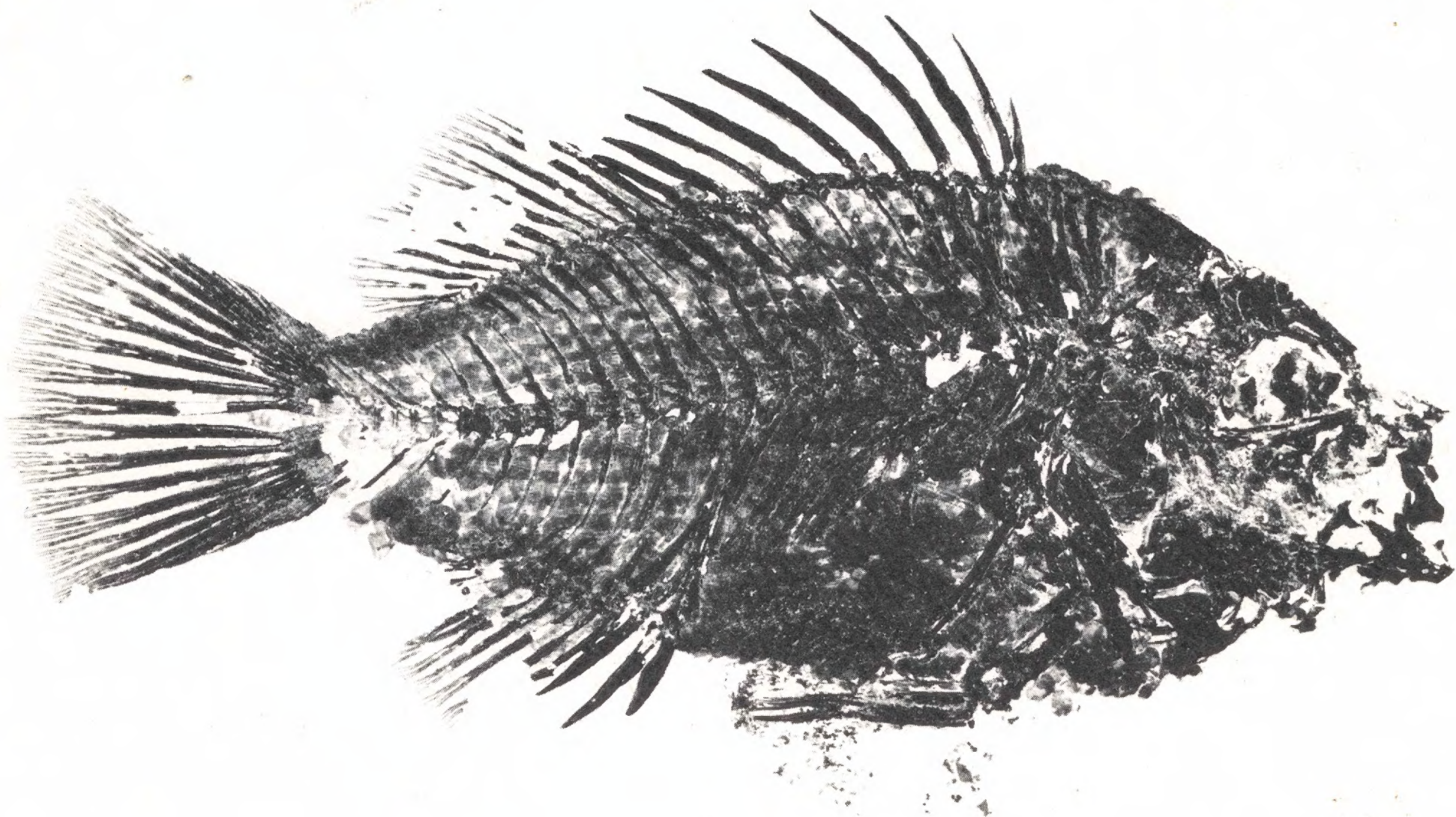
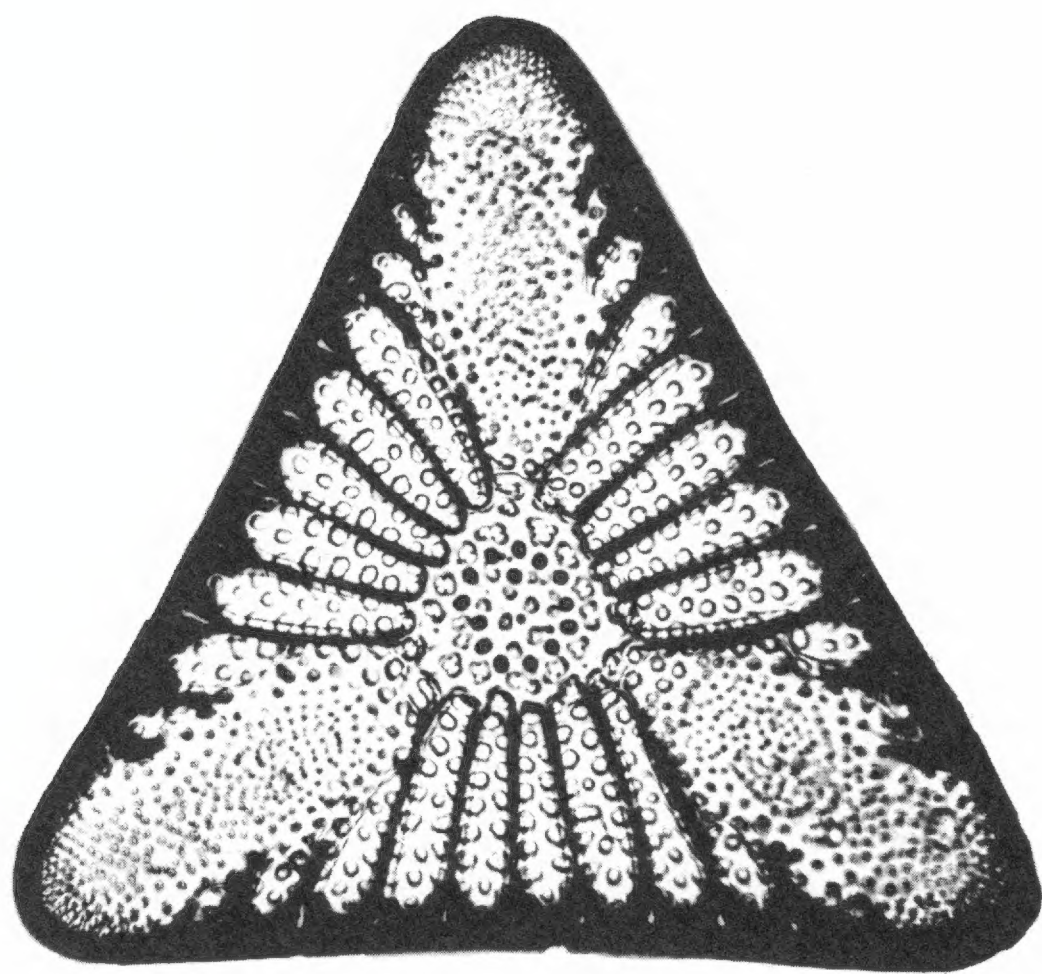


ANNUAL REPORT  
OF THE  
CALIFORNIA  
ACADEMY  
OF SCIENCES  
1966-1967







# ANNUAL REPORT OF THE CALIFORNIA ACADEMY OF SCIENCES 1966-1967

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CALIFORNIA ACADEMY OF SCIENCES  
GOLDEN GATE PARK, SAN FRANCISCO, CALIFORNIA 94118



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## A MESSAGE FROM THE CHAIRMAN

THE great public attractions of the Academy—the Aquarium, the Planetarium, the Science Museums—are known to millions of people. The research activities performed behind the scenes are not as well known but are covered fully in the Director's report which follows. An even less heralded activity is one deserving special mention—the role of the Academy in education aimed not only at young people but also toward postgraduate and other mature scholars.

Each year, hundreds of thousands of school children enjoy the Science Museums, Steinhart Aquarium and Morrison Planetarium. To assist the conscientious teachers who shepherd their charges through our halls, "A Teacher's Introduction and Guide to the California Academy of Sciences" has been prepared. This has been distributed widely and is still available through written application.

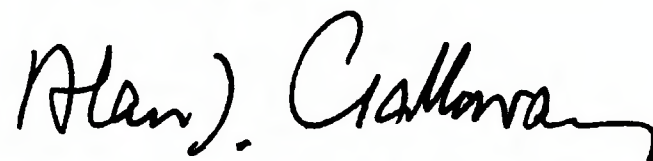
Nearly 60,000 youngsters attended special educational programs in the Planetarium last year. Further, 268 joined the Junior Academy which provides laboratory work, field trips and other engrossing projects for young scientists.

At a higher level, the most direct service is the use of the Academy's collections and research facilities by graduate students working for advanced degrees, often under the direct supervision of an Academy curator. The number varies from semester to semester, but such students can always be found at the Academy. A great attraction is the ready availability of the J. W. Mailliard, Jr., Library which is used extensively by them as well as by the research staff.

A further and gratifying service is the curatorial work involved in furthering graduate studies in other institutions. Nearly 60,000 specimens from Academy collections were loaned last year to students and scientists across the nation. Approximately 1000 pages of scientific studies were published and were distributed to 800 universities, museums and scientific societies.

A little-accented but time consuming service is that freely performed by senior members of the scientific staff as officers or on boards and committees of outside agencies. These include The American Association for the Advancement of Science, The San Francisco Zoological Society, The Cooper Ornithological Society, The American Society of Ichthyologists and Herpetologists, The American Malacological Union, The National Academy of Sciences, The National Science Foundation and others.

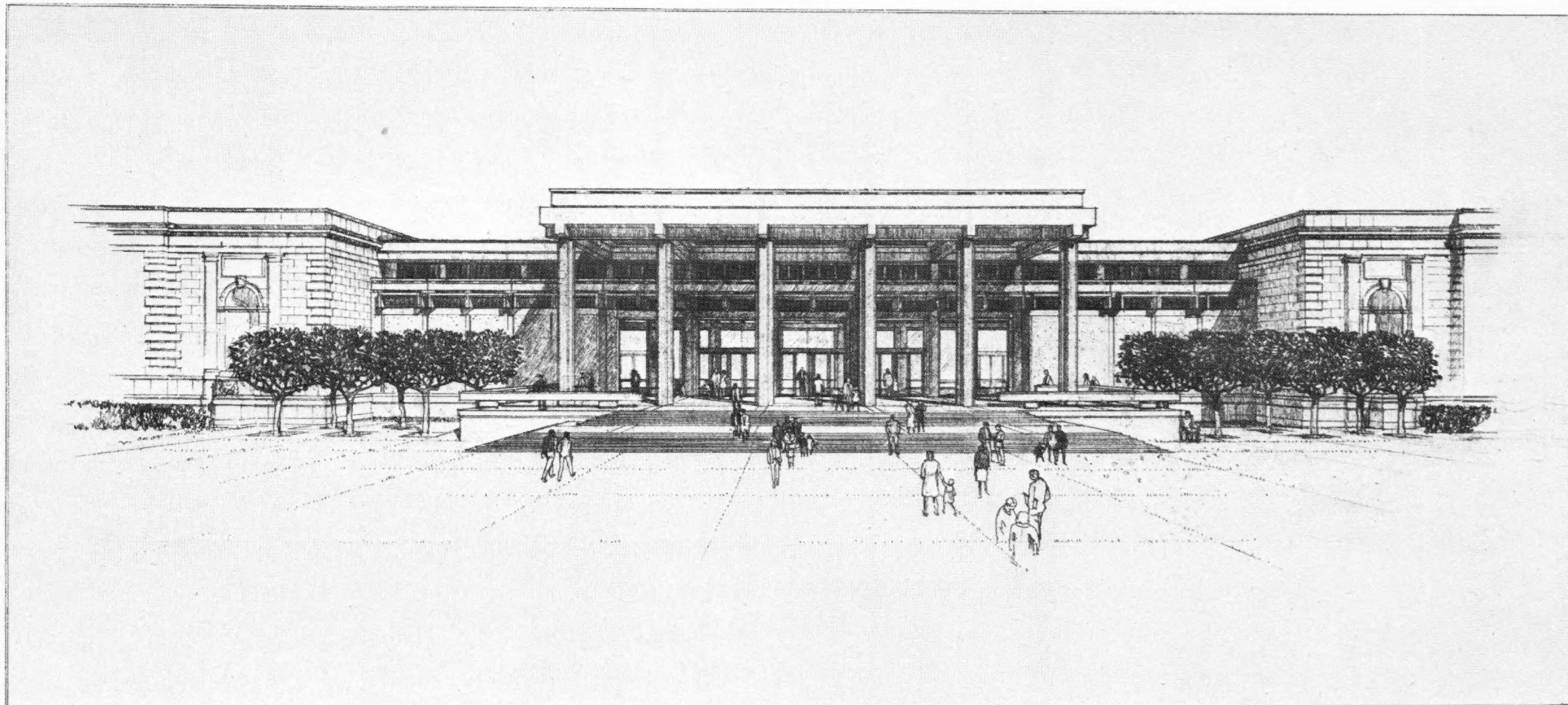
Thus, a great measure of the Academy's role is educational—which is exactly as it should be. We are grateful to our Members, to our generous donors, to the City and County of San Francisco, and to our corporate supporters who make all these vital services possible.



ALAN J. GALLOWAY

*Chairman, Board of Trustees*





Cowell Hall, connecting the North American and African Halls, will provide a grand entrance to the Academy buildings, a spacious exhibit hall, and new areas for offices, a restaurant, and temporary exhibits. It is a gift from the S. H. Cowell Foundation.

## REPORT OF THE DIRECTOR

THE YEAR ending June 30, 1967, was another one of progress for the California Academy of Sciences. It saw the completion of plans for Cowell Hall. The construction of this important addition to the Academy complex will be under way before 1968. Again the Academy was the most popular museum in the western United States. Door counters recorded 2,813,808 visitors, which accentuates the acute need for the new areas and facilities which our new Cowell Hall will provide.

As usual, Academy scientists explored the natural world, far and near, including Africa, India, the Galapagos Islands, Baja California, and other parts of Mexico.

A study of the present and future needs of the research departments was completed and its recommendations were approved by the Science Council and the Board of Trustees. A grant of \$177,600 was received from the National Science Foundation, to modernize the Ichthyology Department and incorporate the fishes of the George Vanderbilt Foundation, now at Stanford University, with Academy collections.

There was steady progress in all departments of the Academy. Nearly one thousand pages of scientific reports were published. New exhibits were completed. An Academy documentary film, "Expedition," had its premiere. Morrison Planetarium produced its most popular programs.

This is a report of that progress and of the general condition of the California Academy of Sciences.

## HIGHLIGHTS

Among the special events of the year was the annual Meeting held October 5, 1966, after which open-house tours were conducted to show the behind-the-scenes workings of Steinhart Aquarium and the departments of Ornithology and Mammalogy, Entomology, and the J. W. Mailiard, Jr., Library. Eighteen hundred members and guests attended.

The annual meeting and banquet of the Fellows of the Academy was held in Simson African Hall on November 2. Dr. William H. Pickering, head of the Jet Propulsion Laboratory of the California Institute of Technology, spoke on moon exploration carried out under his direction. Dr. Carl L. Hubbs of Scripps Institution of Oceanography was awarded the 1966 Fellows' Medal in recognition of his contributions to oceanography and to marine and terrestrial biology.

In January the Academy was host to the scientific complement and crew of the Russian oceanographic vessel *Mikhail Lomonosov*. The Russians reciprocated with a ship's tour for Academy scientists.

The fourteenth San Francisco Bay Area Science Fair was held at the Academy April 9-14, during which 300 finalists of competitions involving more than 5000 young people exhibited their research projects to some 70,000 visitors. The Academy also was host to all of the participants





Above, Dr. Carl L. Hubbs (center) was presented the 1966 Fellows Medal by Academy President J. Wyatt Durham (left) and Director George E. Lindsay. Below, Dr. Earl S. Herald greeted His Imperial Highness Crown Prince Akihito of Japan, who made his second visit to Steinhart Aquarium.



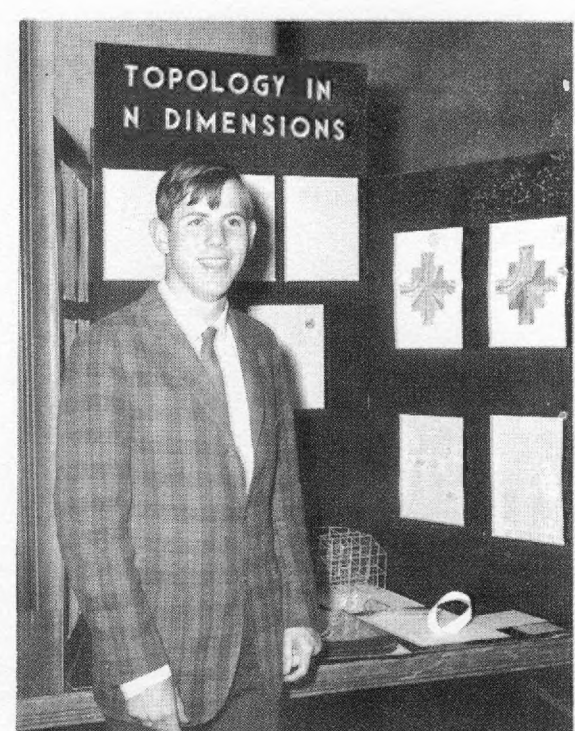
in the International Science Fair on May 8-12, the first time it had been held in San Francisco. This fair was located in Brooks Hall because of space requirements.

His Imperial Highness, Crown Prince Akihito of Japan made his second visit to Steinhart Aquarium on May 9, 1967, bringing with him a number of rare fishes and giant crabs as gifts to Dr. Herald and the people of San Francisco. The Crown Prince is a skilled ichthyologist, specializing in gobies. Also ichthyological was the Annual Fish Show of the San Francisco Aquarium Society which was held in North American Hall on May 27-30.

Special meetings of the Shark Panel of the American Institute of Biological Sciences brought 200 shark specialists to the Academy for two days in February. This is an international program supported by the Office of Naval Research. The Academy hosted the 47th annual meeting of the American Society of Ichthyologists and Herpetologists, held at the Jack Tar Hotel, June 18-23, 1967. Four hundred scientists were in attendance from all parts of the United States, Canada and Mexico. Mr. W. I. Follett, Curator of Ichthyology, was chairman of the local committee, composed largely of Academy personnel.

## FIELD WORK AND EXPEDITIONS

The exploration of the natural world has always been a primary function of the Academy. The inventory and classification of the living things whose world we share, the study of past forms of life which are now known only through their fossil remains, and investigations of earth sciences continued through this year.







Dr. Edward S. Ross, Curator of Entomology, collected specimens from a mushroom-shaped termite nest near Liboma, Cameroon. The map shows the route of the Ross 1966-67 expedition.

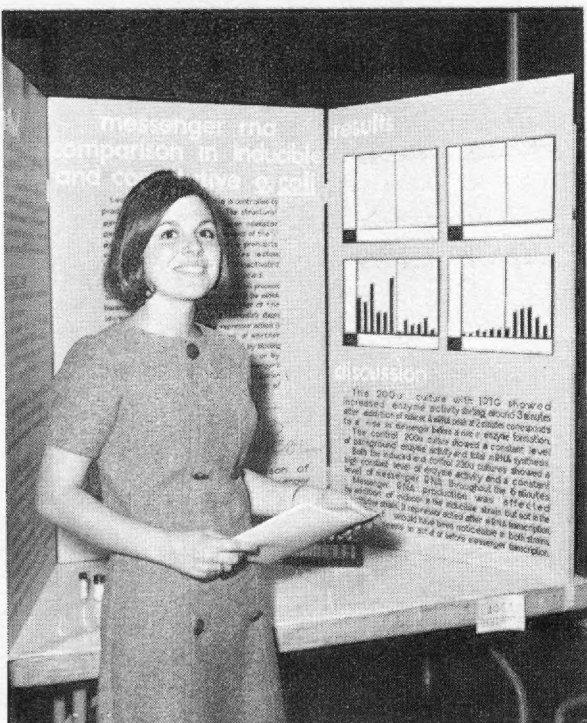
The accompanying map shows the route of the Dr. Edward S. Ross "insect safari" which departed San Francisco on June 17, 1966, and returned in late January 1967. A full range of African life zones was traversed but the main field effort was made in the rain forests of Cameroon, one of the basic evolutionary centers of that huge continent. The principal purpose of the expedition was the quest of Embioptera, a primitive order of insects about which Dr. Ross is the world authority. Very extensive collections of all kinds of insects, about 200,000 specimens, were made,

and a comprehensive photographic record of the natural history, anthropology, and geography of the areas visited was obtained. In addition to Dr. Ross, the party included Mrs. Ross, their son Clark, and a student assistant, Kenneth Lorenzen. H. Vannoy Davis, an Academy Fellow, joined the party for a few days.

Dr. George E. Lindsay participated in a short safari in Kenya and Tanzania in September 1966. Dr. and Mrs. Michael Soule of the University of Malawi and Mr. and Mrs. Robert Lowis of Nairobi made up the party which spent three weeks photographing and collecting in the game areas.

Drs. Ira L. Wiggins and Duncan M. Porter went to the Galapagos Islands in January and February for field research and collecting necessary for the preparation of a flora of the archipelago under an Academy grant from the National Science Foundation. Thirteen islands were visited and 500 separate plant collections were made, with duplicates for distribution to other botanical institutions. The expedition was a joint venture with the University of California, which sent scientists and a film crew to make educational motion pictures. This also was with the sponsorship of the National Science Foundation.

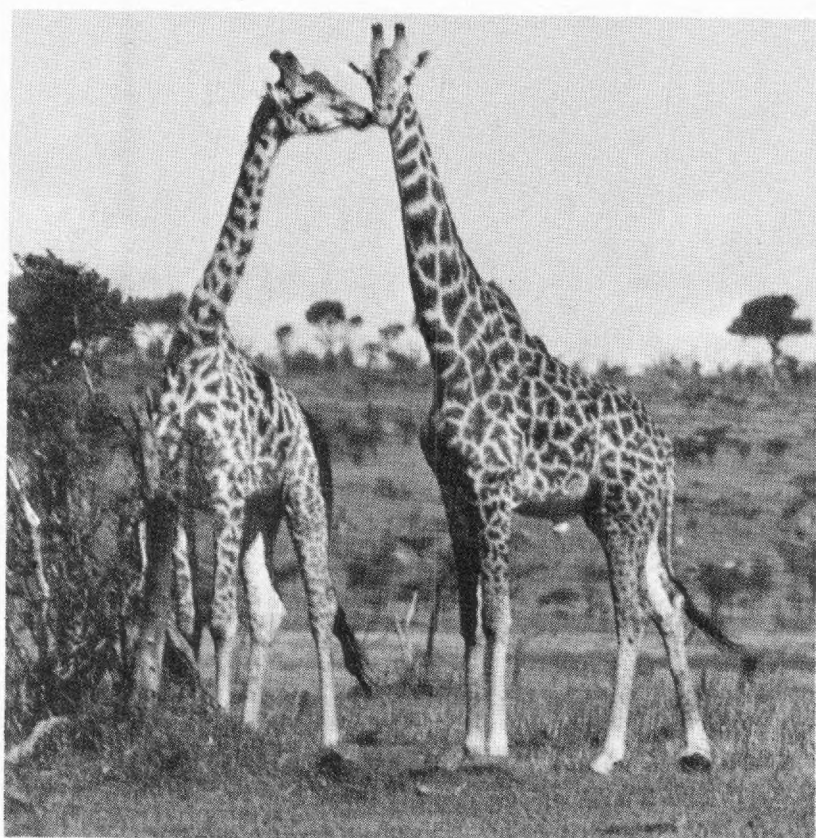
Underwater collecting of living fishes and invertebrates for Steinhart Aquarium was the purpose of a trip between La Paz and Mulege, Baja California, which Dr. Earl S. Herald and Mr. Walter Schneebeil made from April 15 to 25 as guests of Mr. Edwin Janss aboard his 58-foot cruiser "Cuckoo's Nest." Many fine specimens including a



Science Fair prize winners included, left to right, David Dummit, 7th grade; Helen Kuziara, 8th grade; Ma-saaki Yamato, 10th grade; Stephan McMillan, 11th grade; and Eileen Moffitt, 12th grade.



Right, common dolphins  
in the Sea of Cortez.  
Below, a photographic safari  
in East Africa was headed  
by Academy Director Lindsay.



Above, giraffes in Kenya. Right,  
the underwater environment of the  
Sea of Cortez was explored  
by Dr. Earl S. Herald and his  
party of marine biologists.





spectacular new species of nudibranch mollusk were netted, and flown to San Francisco. Dr. Herald also represented the Academy at the Pacific Science Congress in Tokyo in late August, 1966. Following that he spent three weeks in the vicinity of Calcutta, India, and northward in the study of the blind dolphin of the Ganges, specimens of which he hopes eventually to acquire for aquarium display and study.

While field work in far off areas is essential to certain of the Academy research projects, very important work remains to be done close to home, and this was not neglected. Some of that work will be mentioned in the report of the various departments.

## STEINHART AQUARIUM

Earl S. Herald, Associate Director and Head, Department of Aquatic Biology. Steinhart Aquarium was a gift to the people of San Francisco, with the provision that it be a part of the Academy with support by the City. Under Dr. Herald's direction it has developed the most beautiful collection of living fishes on exhibition in the world today. It is the major public attraction of the California Academy of Sciences. Thousands of visitors crowd its corridors every day of the year.

In addition to its spectacular displays of fishes and aquatic invertebrate animals, the Aquarium has two kinds of dolphins. "Whiskers" and "Buddy" are rare freshwater dolphins from the Amazon river, given by the San Francisco Aquarium Society and the Aquarium of Niagara Falls. "Him" and "Her" are Pacific whitesided dolphins, a donation from Marineland of the Pacific. Two additional females, (promptly dubbed "Him's Harem"), were provided by Marineland during the year, and the compatible four are now housed in the Aquarium's largest tank. Sharing the tank is "Cissy," a harbor seal, and a cormorant.

When His Imperial Highness, Crown Prince Akihito of Japan, visited the Aquarium on May 9, 1967, he brought with him a number of living fishes not previously displayed in this country, including rare deep-sea pinecone fish.

The Aquarium maintains a handsome display collection of living reptiles from all over the world, as well as

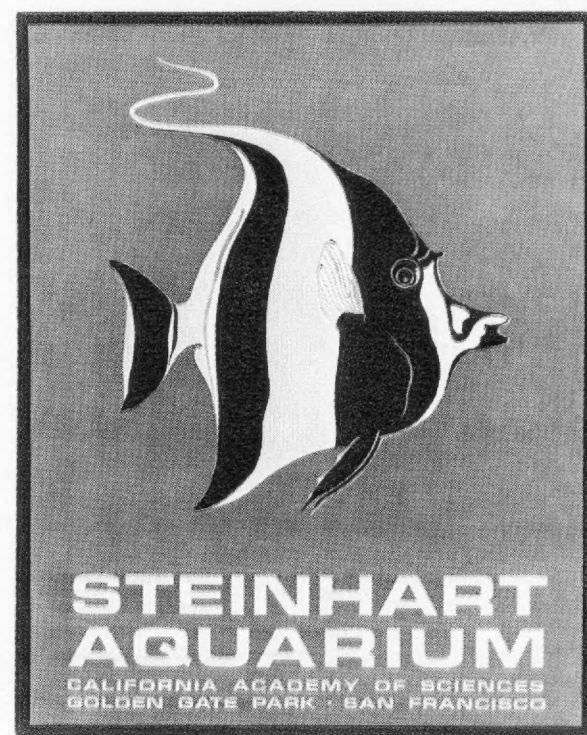
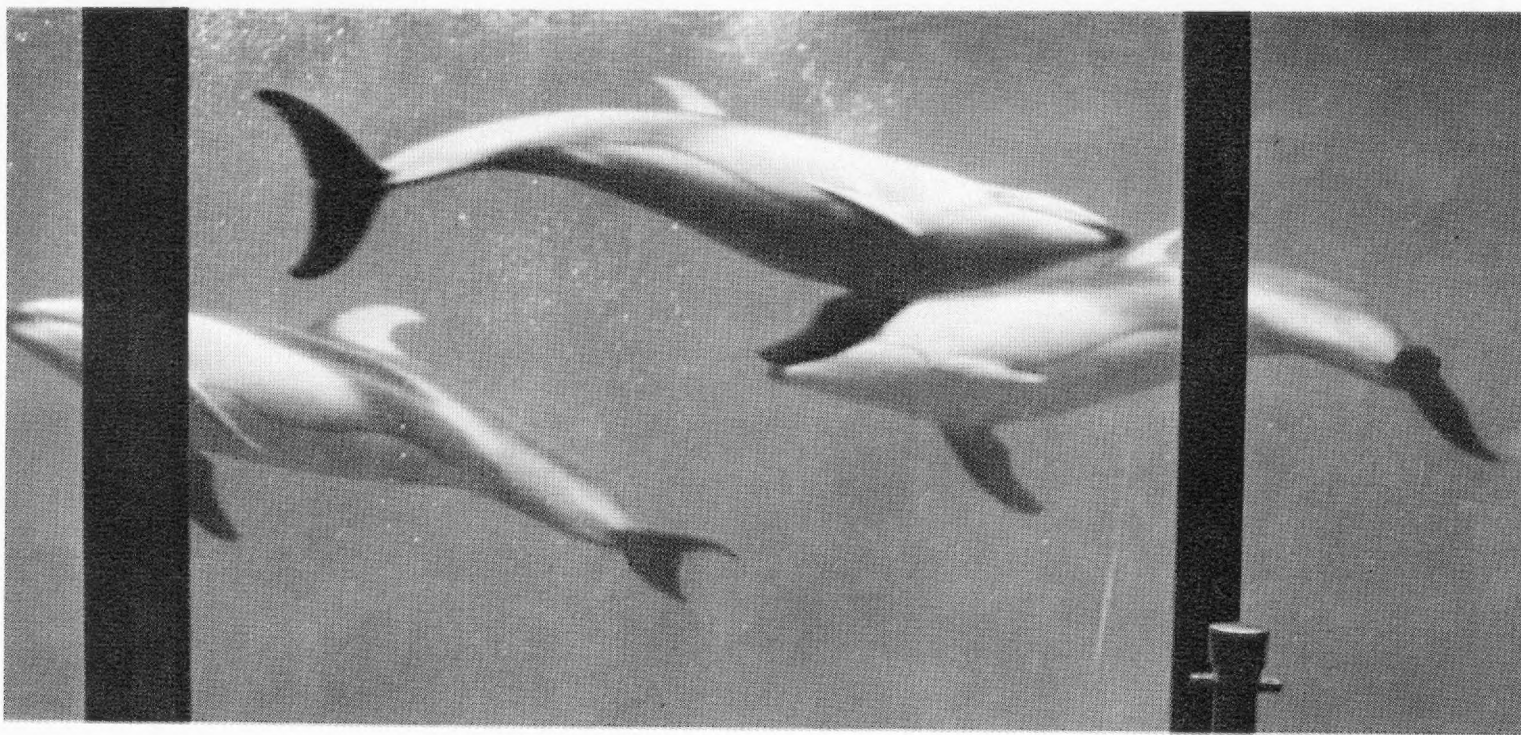
a large collection of living amphibians. The Carmany amphibian panel was doubled in size to accommodate rare new specimens.

While the Aquarium is chiefly concerned with educational exhibits, it is also a research center for systematic biology and aquarium techniques and equipment. Tank space was provided for a series of cooperative experiments on tagging techniques with the California Department of



Steinhart Aquarium is the Academy's most popular attraction.





Above, Pacific white-sided dolphins share the large "inside-outside" dolphin tank. Above right, the new Aquarium poster, available at the sales desks. Right, Dr. Earl S. Herald, Associate Director for Steinhart Aquarium, displays a small cobra to Academy visitors. Below, Aquarium staff members often have unusual duties. Below right, finishing touches were added to new units of the Carmany Amphibian exhibits by Aquatic Biologist Fred Jenne.



Fish and Game. Assistant Superintendent Robert P. Dempster and chemist William Shipman studied the effects of copper and hydrogen peroxide in disease treatment and purification of water. Research Associate Frederick Frye, D.V.M., worked on problems of alligator and turtle infec-

tion. Dr. Ben Papermaster and his immunological research group at the University of California utilized Aquarium facilities and animals for physiological studies. The Office of Naval Research awarded a one-year contract for \$7026 to the Aquarium and the Department of Herpetology for



studies of the constituents of blood of sharks and shark-like fishes, and the venoms of reptiles.

Many of the organisms shown in Steinhart Aquarium were collected by the staff, or were received in exchange for collected specimens. Scuba divers, nets, hook-and-line, traps, and various other techniques were used to capture the animals. Those to be transported any distance were usually sent by air, but ships of the Standard Oil Company of California continued to carry tanks for free delivery of fishes to and from Steinhart. Aquarium tanker trucks equipped with air pumps met the ships, or were used to bring back the animals from local collecting trips.

## MORRISON PLANETARIUM

Michael A. Bennett, Acting Manager. Morrison Planetarium had 939 regular programs, attended by 148,667 persons, and 182 special educational programs, attended by 57,356 students, between June 1, 1966, and May 31, 1967.

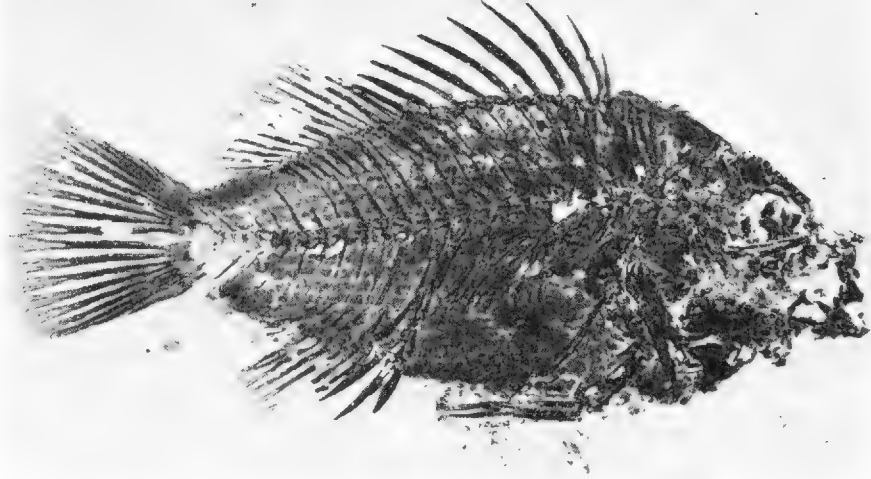
Eleven hundred and twenty-one programs, viewed by 206,023 people! In addition, 288 adults enrolled in one of the six evening courses in astronomy or celestial navigation offered by the department. More than three thousand written requests for information received replies. Thousands of telephoned questions were answered.

Built as a memorial to Alexander F. Morrison through bequests and public subscription, the Planetarium is serving our community well. Astronomy is not included in the curriculums of most schools, yet man is increasingly aware of the importance of things away from our earth and of the forces which govern the universe. These forces, and vast dimensions with which we are not familiar, are difficult to comprehend when studied in textbooks. But an hour in the Planetarium, listening to the carefully developed lecture in combination with the visual illusion produced by complicated projection equipment, gives one an understanding and appreciation of the wonders of the universe he could get in no other way. A planetarium program is

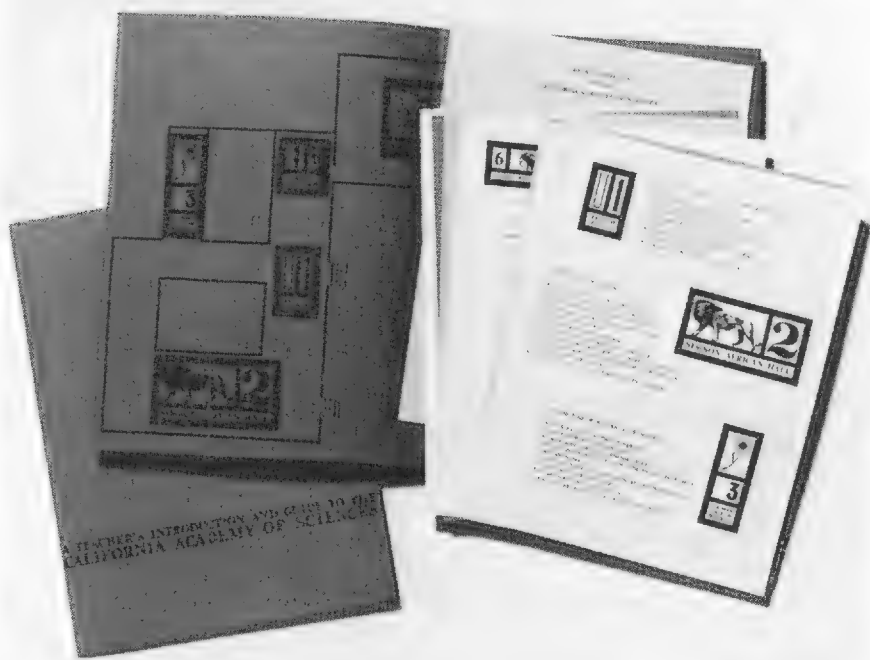


Morrison Planetarium programs were viewed by 206,023 persons, 57,356 of whom were students who came in class groups to see special educational presentations.





Junior Academy members, under the direction of Supervisor Ken Lucas and instructor Darrel McKenzie, conducted laboratory and field research in the life and earth sciences. Field trips were made as far as Wyoming to collect fossil fish. The Junior Academy also distributed a guide for teachers who brought their classes to the Academy.



a thrilling experience for anyone, whether he be a young child or a sophisticated adult. A planetarium program, as an educational experience, could not be duplicated in the greatest astronomical observatory. A planetarium show *is* an illusion, of course, as is a Rembrandt painting or a Shakespearean play. A planetarium is not an observatory but an educational device and a place of entertainment. Morrison planetarium has in its 15 years made life fuller for well over a million people.



## JUNIOR ACADEMY

Ken Lucas, Supervisor, and Darrel McKenzie, Instructor. The California Junior Academy is a center for the scientists of tomorrow. And a very active center it is, with 151 members in the 10-15 years age group, and 107 who are between 16 and 21. These young people took the summer courses offered by the department, met afternoons and on Saturday during the school year, participated in field



trips, collected natural history objects, and carried on their individual or group research programs. They published *Student Discovery*, which reported results of individual research projects.

Field trips were to areas as near as Moss Beach, others as distant as Wyoming, Nevada, and Arizona. Some were for a day, a few were for a week. But all provided opportunities not otherwise available for the budding biologists to observe wildlife in the field, to collect materials for later laboratory studies, and to develop healthy interests in the natural world.

Many of the older student members are volunteer helpers for the younger investigators. Older student members, having "graduated" from the courses for the younger members, serve as "curators" of the various scientific study collections of the Junior Academy. Not all of the specimens are preserved; there is a sizable menagerie of pampered pet "wild" animals and aquaria filled with fishes and amphibians.

Mr. Lucas has expanded the activities of the Junior Academy to include specimen loans to teachers; tours for Scout groups, nature clubs, and biology classes; guest lectures in schools, especially schools for the handicapped and blind; and providing field experience for biology teachers. Many Boy Scouts use the Junior Academy for preparation and examination for merit badges.

In the past, it has been impossible to provide guide service for the thousands of school groups who come to the Academy each year. To alleviate this situation, a 15-page *Teachers Introduction and Guide to the California Academy of Sciences* was developed by Mr. Lucas and Hal Richardson, Public Information Officer, and sent to every school in the 11 Bay Area counties. Arresting and colorful in format, it contains a map of the institution, descriptions of each of the display areas, and lists of facts useful to the teacher in developing pre- and post-visit discussions, together with general information about facilities and services. Two thousand copies which were printed and distributed free proved so popular that a second printing of the Guide was necessary.

The generosity of an Academy member provided a new dissecting microscope for the students, and others gave funds which were used to purchase books, chairs, and the many kinds of equipment required by the junior scientists.

The Junior Academy is an active and rewarding department. It is a place where the delicately poised interests of young people naturally channel themselves into productive endeavor. Many professional biologists and medical doctors were, as children, introduced to science in the Junior Academy.



The J. W. Mailliard, Jr. Library is an important research facility for Academy staff members as well as advanced students and visiting scientists.

## J. W. MAILLIARD, JR. LIBRARY

Ray Brian, Librarian. The library is an important resource for the whole scientific community. It is maintained primarily for the Academy staff and membership, but it also serves other research scientists, faculty members, and graduate students from other educational institutions, and all others who need to consult its special materials. Interlibrary loans are made to institutions far and near.

During the year the major single purchase was Keller's herpetological library which was obtained from Mrs. J. C. Thompson. This important scholar's working collection included rare early publications which are not often available. By other purchases the library added 299 specialized titles, and there were more than 100 gift accessions, some of which included several items.



The Academy exchanges its own scientific publications for those of about 800 other institutions, and this is an important source of highly essential journals from all over the world. The reexamination and systematizing of the exchange list was one of the projects accomplished this year. Other journals were purchased. In all, thousands of pieces are received and processed annually.

New professional librarians, Esmé Segel and Clara Gross, joined the staff as assistant librarians.

The help of non-paid volunteers is most important, and the library would have been crippled without it. Library Associates Julian Arntz, Margaret W. Campbell, and Anson Herrick gave regularly of their time, as did Library Volunteers Paul H. Anderson, Adele Nussbaum, Jessie Saunders, Ellen Siemsen, and Pat Smith.

## PICTURE COLLECTION

Johan Kooy, Chairman. The picture collection is an archive of historic photographs and other illustrative materials concerned with the Academy, and a place where all kinds of graphics of natural history subjects are preserved for referral as needed. It is a service department for the Academy and for the community, particularly for schools. During the year 4429 items were loaned.



Picture Collection Associate Paul Anderson donated a number of quality 18th and 19th century prints of botanical and zoological subjects, and gave the department his own time and important financial support. Among gifts from Mrs. Somers Peterson was a set of large plates illustrating more than 1000 species of American birds. Donations, purchases, and transfers from other departments account for the growth of the reference collection from 45,000 pictures in 1962 to over 380,000 in 1967.

Mr. Anderson has charge of the Reference Collection, Associate Muriel French worked with the botanical slides, and there were many other volunteers who specialized; Mrs. Ray Philipson—reference; Miss Alan Mitcham—mammals; Miss Lilian McHoul—botanical prints; Mrs. Roger Ketcham—marine animals; and Mrs. Eva DeBecker—ornithology. Two notable botanical artists, Mr. Henry Evans and Mrs. Mary V. Roberts, added generously to their works already held by the Academy.

## PACIFIC DISCOVERY

Bruce Finson, Editor, and Johan Kooy, Art Director. The bimonthly magazine *Pacific Discovery* is a non-technical journal for Academy members. During the year its popular articles took its readers on Academy expeditions to the Amazon, Alaska, Africa, and the islands of the Gulf of California—exploring the natural world. About half of



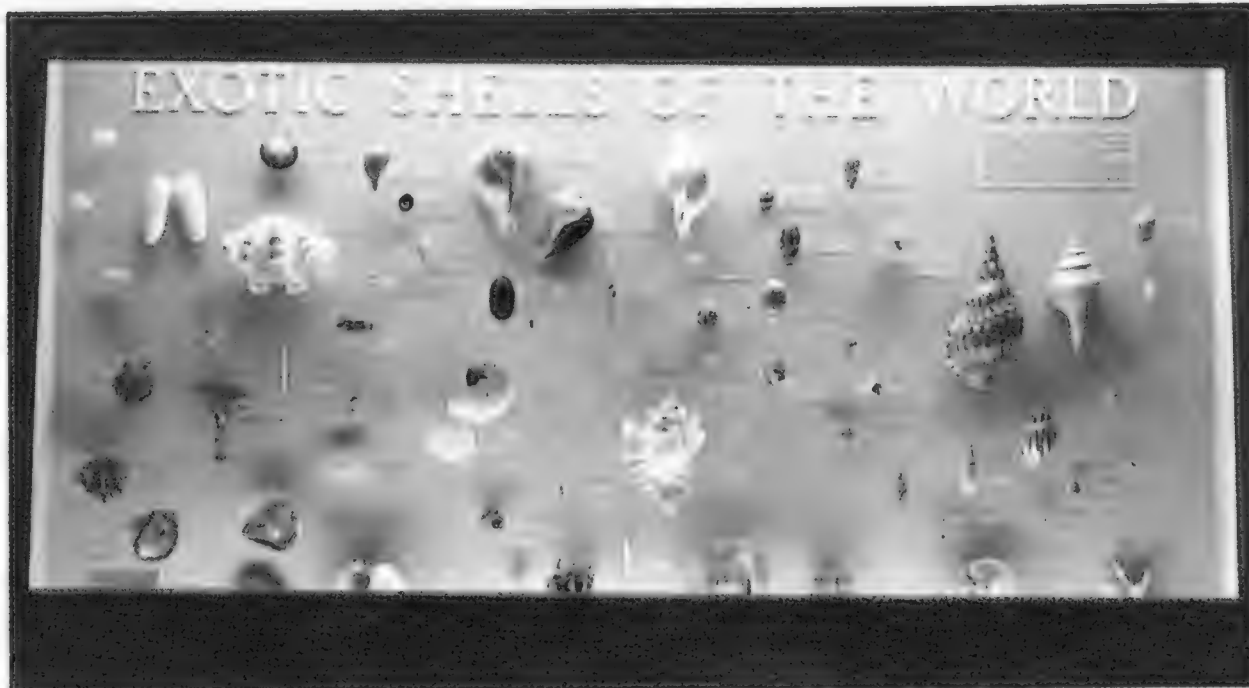
Left, Editor Bruce Finson and Art Director Johan Kooy discuss a layout for *Pacific Discovery* with Hal Richardson. Above, Business Manager J. Byron Warner and Chief Stationary Engineer William L. Denevi approved a new main electrical switchboard for the Academy complex. This was the first construction for Cowell Hall.





Left, the John Ward Mailliard Memorial Exhibit of Birds of the San Francisco Bay Region was completely renovated and redisplayed in thirteen new walnut cases. Left below, a dramatic new exhibit of shells was installed in Steinhart Aquarium. Below, the North American Hall of Birds, which houses the Mailliard exhibit. Bottom, the blue whale skeleton in the court behind North American Hall was restored.

13



the articles were written by staff members, and Hal Richardson's page, "Academically Speaking," described some aspect of the institution in each issue. But *Pacific Discovery* is much more than a house organ—it is a general natural history magazine which deserves its enviable reputation for the quality of its contents, illustrations, and attractive format.

A new member was added to the Editorial Board this year, Dr. Robert I. Bowman of San Francisco State College, who is also a Research Associate and Fellow of the Academy. Other board members are Robert C. Miller,

Robert T. Orr, and George E. Lindsay, all of whom reviewed many manuscripts and attended numerous meetings in the business of producing the magazine.

## EXHIBITS

Mearl F. Carson, Chairman and Curator. A museum's effectiveness and reputation are reflections of the quality of its exhibits. A museum is where one can see the actual objects he has read about—gold nuggets from the mother-lode country, a golden cowrie shell from the south





The Academy's varied exhibits offer rich educational opportunities to youth.



seas, a Persian lamp or an 18th century clock, California condors — and at the Academy we use the motto "everything under the sun." During the past year progress was made in improving existing exhibits and twenty-four new permanent displays were completed.

The great blue whale skeleton, which had deteriorated for many years and was in actual danger of collapse, was rehabilitated, painted, its supporting structure rebuilt, and the whole protected from the depredations of souvenir collectors and graffiti artists. Lights were installed in the outside exhibit to discourage vandals.

The Mailliard collection of birds of the Bay Region was completely refurbished. Old cases and a barrier down the center of the North American Hall of Birds were removed and the specimens were renovated and placed in thirteen new walnut cases. "Exotic Shells of the World" was a new three-unit display installed in the Aquarium alcove. Additional non-living exhibits for the aquarium were a fine cast of a Coelacanth, the exciting "living fossil" which is thought to represent the form of fish from which air breathing amphibians may have evolved, and a giant 1286-pound leatherback turtle caught off Santa Cruz.



Dr. Edward S. Ross provided an outstanding color photograph exhibition "Camouflage in Nature," close-ups of nature's most ingenious masqueraders, and many other temporary shows and exhibitions were presented.

The Horology Department, with Bruce A. Kock as Honorary Curator, is administered by the Exhibits Department and is responsible for the William Barclay Stevens collection of timekeeping devices. Mr. Kock gave generously of his time and interest in maintaining and improving those displays.

## PUBLIC INFORMATION

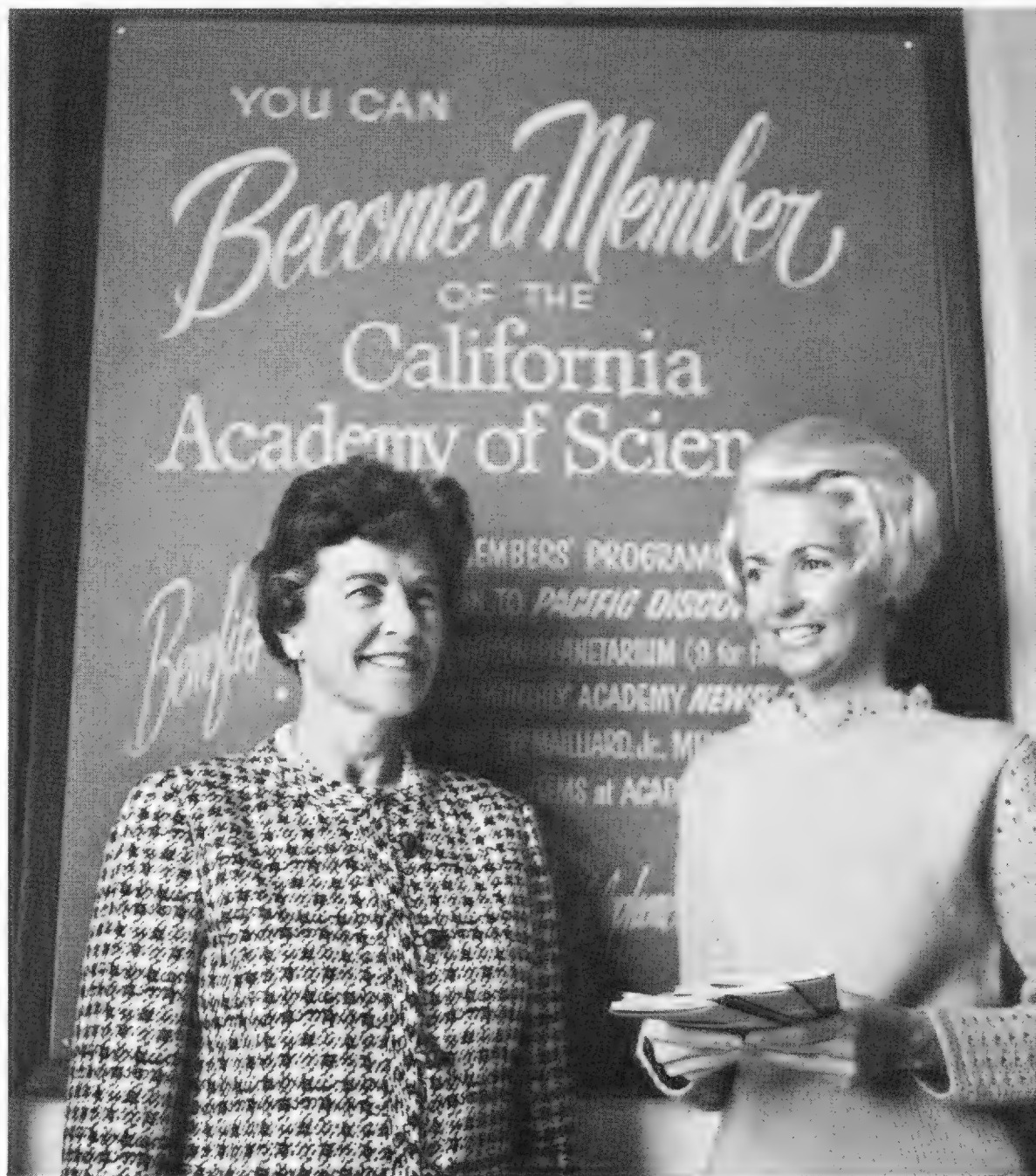
Hal Richardson, Public Information Officer. Some 275 newspapers, local and national magazines, house organs, radio stations, television stations, wire services, etc., received press releases on Academy activities during the

past year. The press book containing the resultant clippings has approximately 1100 different items. The total air time, both radio and television, given gratis to Academy affairs cannot be calculated. Had it been paid for it would have been in the thousands of dollars. We are forever grateful for the interest and generosity indicated by all media in publicizing our planetarium shows, aquarium acquisitions, scientific meetings, awards, etc.

Mr. Richardson writes, edits and directs the distribution of the Academy NEWSLETTER and supplies a bi-monthly column to PACIFIC DISCOVERY. During the course of the year he greets hundreds of visiting scientists, members of the press, groups, foreign visitors, and other distinguished guests. He is in charge of the programs for the monthly membership meetings and other special events held at the Academy, as well as general public relations activities.



Volunteer assistants perform many important functions at the Academy. Mrs. Walther Buchen has maintained the press books for six years.



Academy Trustee Mrs. Joseph A. Moore, Jr. and Membership Coordinator Miss Sue Weaver made plans for increasing the number of Academy members.



## INSTRUMENT AND CARPENTER SHOPS

Alvin C. Gundred, Superintendent. The Instrument Shop provides special equipment for the planetarium and other departments. Through it the Academy is also able to provide duplicates of commercially unobtainable special projectors and exhibits, developed for the Academy, to other non-profit institutions. This year Foucault pendulums were built and installed for the Miami-Dade Junior College in Florida and Clarion State College in Pennsylvania; and a heliostat was installed at the University of South Florida.

The principal projects of the Carpenter Shop were the construction of exhibit cases for the Hall of Minerals and specimen cases for the scientific collections. Minor alterations, painting, and the maintenance of the general Academy plant are also its responsibility.



Stephen B. Craig, Chief Technician of the Planetarium, designs and builds instruments for the special effects required for each planetarium program.

## RESEARCH ACTIVITIES

For more than a century the California Academy of Sciences has served as a center for the exploration and interpretation of natural science, as a repository for and guardian of vast collections of scientific specimens, and as the publisher of the results of research investigations.

The research program is under the general guidance of a committee of Trustees and professional staff members called the Science Council. The Council meets monthly and reports its recommendations at each meeting of the Board of Trustees. The President of the Academy serves as Chairman of the Council.

The Science Council consisted of J. Wyatt Durham, *Chairman*; Paul H. Arnaud, Jr., Ian Campbell, Ralph Emerson, Earl S. Herald, A. Starker Leopold, Alan E. Leviton, Robert T. Orr and Thomas Tilton; and George E. Lindsay, *ex officio*.

## BOTANY

John Thomas Howell, Chairman and Curator. The herbarium contained 464,444 specimens on May 31, 1967. During the year, accessions totaled 17,855 specimens; 11,360 by gift, 4804 by exchange, and 1691 from staff collections. The Academy herbarium is strongest in western North American and Galapagos species, and contains some 1500 holotype specimens.

The Botany Department emphasizes investigations and publications of the California flora, as well as horticultural plants. During the past year Mr. Howell was active in several floristic surveys, alone or in collaboration with others associated with the department. Associate Curator Dr. Elizabeth McClintock is preparing a flora of San Bruno Mountain, San Mateo County, assisted by Walter Knight. She also devoted approximately half of her time to describing horticulturally important families for a new edition of the standard reference, *Hortus III*, with support from the National Science Foundation through Cornell University.

The department is the headquarters of the California Botanical Club, which held some forty meetings or field trips during the year. Two were lengthy — one to the White Mountains and another to Death Valley. Several members of the Club are Research Associates and volunteers in the department and the following gives some idea of the over-all assistance they provided. Lewis S. Rose filed collections, managed exchanges, and attended to bibliographic matters in the herbarium. Gordon H. True was "curator" of the extensive unmounted Sierra Nevada collections in general and his own Nevada County collections in particu-





Above, *Welwitschia marabilis*, a unique "living fossil" plant of the Namib desert of South West Africa, was studied and photographed by Dr. Edward S. Ross. A fauna of specialized insects is associated with these plants. Right, a strange red and black pyrgomorph grasshopper collected in the coastal desert zone northwest of Cape Town during the 1966-67 Africa expedition.



lar. Walter and Irja Knight continued their floristic exploration of San Bruno Mountain with Dr. McClintock and were associates with Mr. Howell in the survey of the Butterfly Botanical Area of the U.S. Forest Service. Indeed, without the help received from all of its research associates and volunteers the department would be severely handicapped.

The Botany Department library, herbarium, and personnel provided much information for the general public, by correspondence, telephone, or in personal communication. Students from local colleges and universities were in the department constantly and during the year 4019 specimens were loaned to 51 research scientists and other institutions. More than one-third of the curator's time was required for such public service.

Among the noteworthy gifts to the department were a fine donation of \$5,000 from Mrs. Edward Hohfeld in honor of John Thomas Howell, for the purchase of botanical books, and gifts of large botanical collections from Research Associates Robert F. Hoover and Ernest C. Twisselmann. Dr. Hoover completed a flora of San Luis Obispo County during the year, and Mr. Twisselmann a flora of Kern County, based on the specimens now deposited in the Academy herbarium.

## ENTOMOLOGY

Edward S. Ross, Chairman and Curator. Accessions to the insect collections totalled 187,821 specimens, of which 103,217 were from Academy expeditions (material prepared this year), 76,062 were gifts, 5,892 were pur-

chased, 1,622 were from exchanges, and 28 types specimens were deposited on permanent loan. Of the gifts from individuals the major items were 26,036 insects (23,971 beetles) from Paul S. Bartholomew, with an additional 749 moths and butterflies from his son David; P. R. Craig gave 5,014 Colombian insects and arthropods; 2,530 beetles were received from D. Giuliani, 1,321 Mexican aquatic insects from R. K. Benjamin and 1,309 well prepared specimens from G. I. Stage. Hugh B. Leech gave 14,941 prepared insects, and Paul H. Arnaud, Jr., gave 5,635. During the year the department accessioned 214 holotype and 104 allotype specimens. There are now 9450 specimens in the type collection, and perhaps 600 more which have not yet been segregated. There are more than three million fully processed specimens in the collection, and more than one million more waiting to be processed. Several important collections which are not yet counted and reported were received during the report period.

The research collection of the Entomology Department is the largest and most important in western North America, and the only one with world-wide coverage. As a result it experiences very heavy visitor use and requests for services. This year 49,972 specimens were loaned to a total of 142 persons in 223 transactions. Shipments went to 15 foreign countries. Most of the borrowers were graduate students in entomological departments of universities. Two hundred and six entomologists visited the department, 91 of them with specific research problems. The total number of visitors was more than 1400.

Paul H. Arnaud, Jr., Associate Curator, assumed many of the administrative responsibilities for the depart-



ment. He is also producing, for the U.S. Department of Agriculture under a contract with the Academy, a "Host Catalog of North American Tachinidae." Dr. Lois O'Brien, Mr. Thomas Halstead, and Miss Ludmeila Axionoff assisted in this monumental task. Dr. Arnaud continued his local collecting, and during one month at the Southwestern Research Station at Portal, Arizona, used six insect flight traps to collect some 40,000 specimens. During the year he was appointed an Associate in the Experimental Station, University of California, Berkeley, and he continued as treasurer of the Pacific Coast Entomological Society.

Hugh B. Leech, Associate Curator, devoted most of his time to the responsible care of the large collection of beetles. Because of that most of his research was conducted on personal time, and his vacation was a collecting trip through northern California, with a second productive trip in the Death Valley region. Mr. Leech is currently working with dytiscid beetles.

Associate Curator Edward L. Kessel continued research on the taxonomy and bionomics of flat-footed and smoke flies (Platypezidae and Empididae). He studied platypezid type specimens at the Snow Museum, University of Kansas, and at the Museum of Comparative Zoology at Harvard University. Dr. and Mrs. Kessel drove across country, collecting en route.

John W. Green, Scientific Assistant, continued his

meticulous preparation of insects and published an important revision of the Nearctic species of *Silis* (Cantharidae: Coleoptera), 65 pages, 65 compound figures. In addition he began preliminary investigations of the Neotropical Lycidae (net-winged beetles), and identified, on his own time, more than 4000 Cantharid beetles for various institutions and individuals.

Scientific Assistant Thomas W. Davies, who had helped as a volunteer, became a regular staff member this year. His personal interest is in lepidoptera.

Department secretary Stella E. Tatro also assists as preparator when other duties permit.

## GEOLOGY

G Dallas Hanna, Chairman and Curator. Leo G. Hertlein, Curator of Invertebrate Paleontology. The Geology Department includes several rather diverse subdivisions which in some institutions are treated as separate entities. At the Academy they are handled as a larger unit, with unified record system, to enable two scientists to handle the "housekeeping" of the enormous number of specimens. Thus the type collection, in which 12,000 items are designated as type material, includes fossil invertebrates, recent shells, fossil and recent diatoms, and fossil foraminifera.

The department is well-known for its contributions in invertebrate paleontology and the collections are particularly strong in Jurassic, Cretaceous, and Tertiary fossils. Regions best represented are western North America and Baja California. But from the standpoint of world attention and prestige the large collection of diatoms, the result of Dr. Hanna's lifetime investigations of these organisms, is equally important. Diatoms are microscopic unicellular plants with silicified skeletons which preserve well as fossils. The collection contains some 20,000 "worked" slides, with thousands of species and millions of specimens. A large collection of California foraminifera, microscopic animals with calcareous shells, is also mounted on 4000 microscope slides which are cared for by Research Associate Clifford C. Church.

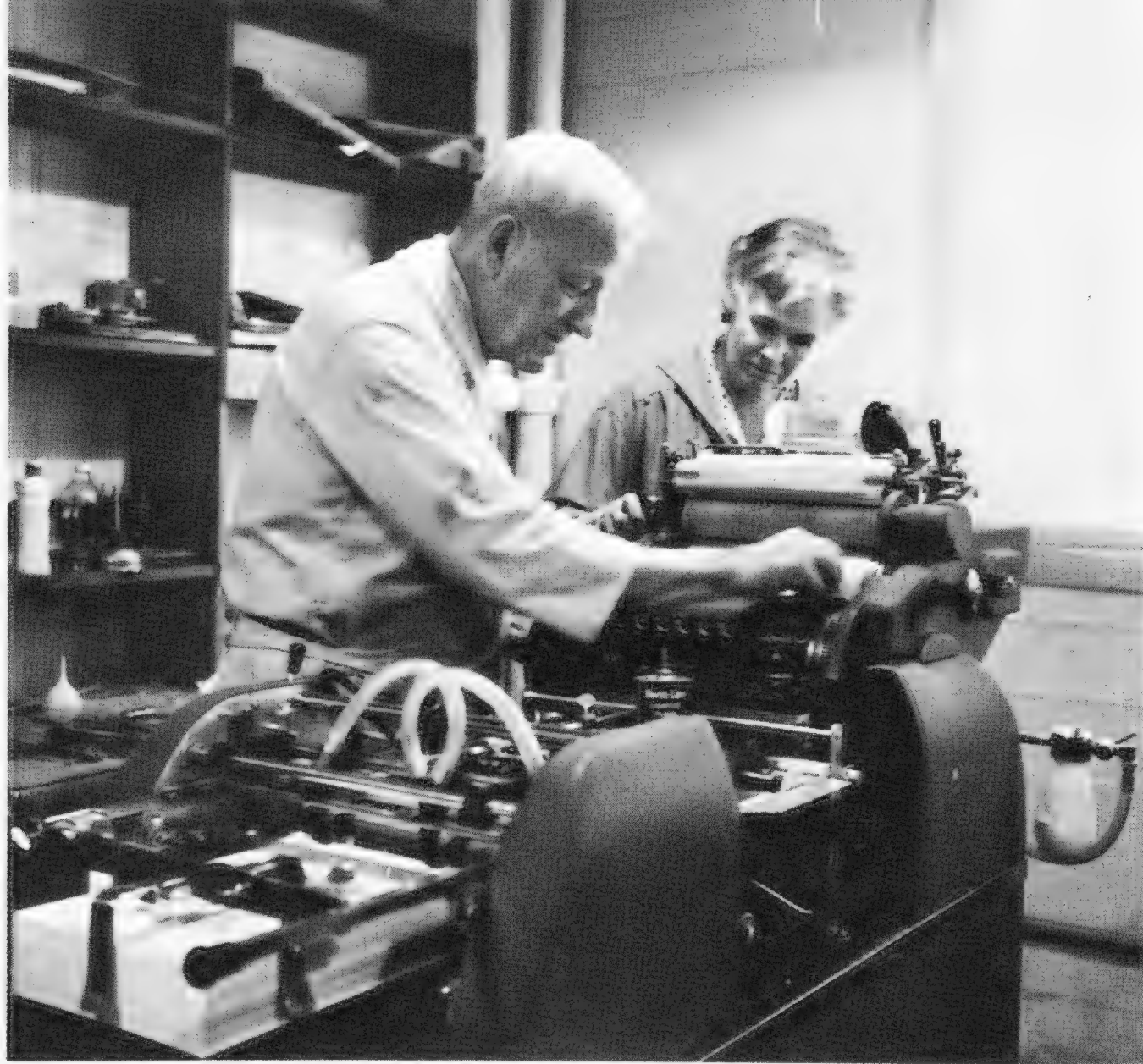
The Academy's large collection of Recent shells is also a part of the Geology Department. Recent shells are used in connection with studies of fossil forms, and of course are themselves the subject of research. A most important addition to the department during the year was a large collection of Recent gastropods and a fine conchological library through a bequest from Miss Ruth E. Coats of Carlsbad, California.

The Geology Department also has important research and display collections of minerals, several private



Mr. William H. Howe, skilled illustrator of butterflies, came from Kansas to paint rare specimens available only in the Academy.





Left, Dr. and Mrs. G Dallas Hanna printed full-color illustrations for some of the Academy's scientific publications. Below, photomicrography reveals the intricate design of a diatom of the genus *Triceratium* from a core sample taken from the depths of the south Atlantic.



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individuals having selected it as the repository for their extensive personal collections. Mr. Charles W. Chesterman, Honorary Curator of Mineralogy, is integrating more than 7500 specimens into a systematic unit for research and educational purposes. He also advised the Exhibits Department concerning the new mineral and geology displays which were under construction through the year.

Dr. Hanna, a Fellow of the Royal Microscopical Society of London for more than 30 years, attended the centenary meeting of that active organization in July. After the meeting he photographed specimens in the Paris Museum. His return from Europe was via Fairbanks to attend a meeting of the National Academy of Sciences panel on the biological effects of the March 1964 Alaska earthquake. He returned to Fairbanks for another meeting of the panel in January, and attended yet another session at Friday Harbor, Washington, in June.

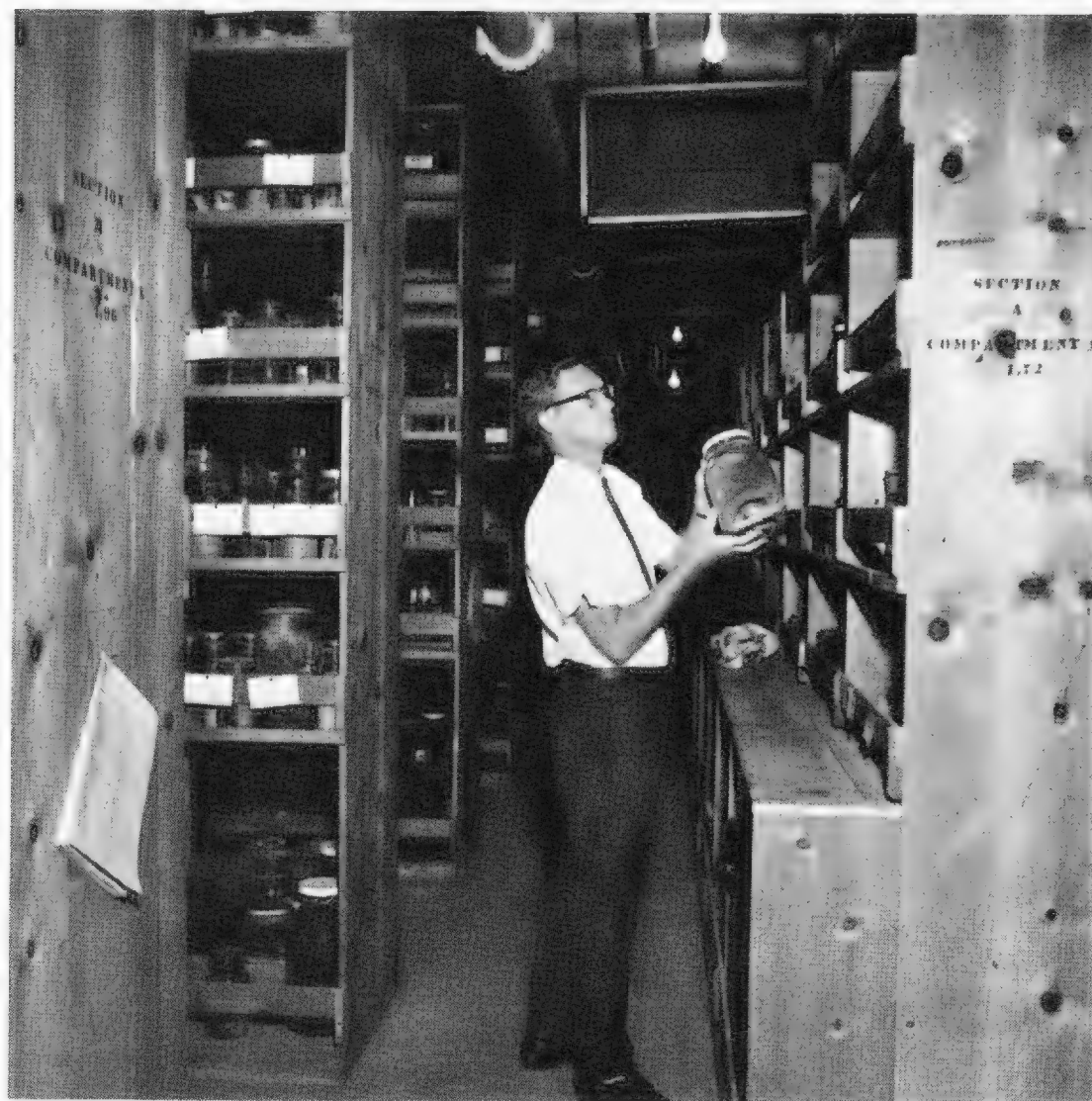
Dr. Hertlein continued research on the fossil mollusks of the San Diego formation and worked on the identification and arrangement of the Academy's collection of fossil and Recent mollusks and echinoids, especially those from the Galapagos Islands.

## HERPETOLOGY

Alan E. Leviton, Chairman and Curator. One thousand seven hundred and fifty eight specimens were added to the research collection, which is unexcelled in western United States. Among notable additions were 502 specimens collected by Ted Papenfuss in Ghana and Cameroon; 248 specimens sent from India by J. C. Daniel; 154 specimens from Mexico, Africa, and Asia which were donated by Lawrence Swan; 99 from Africa, Australia, and Nevada from Edward S. Ross; 98 from New Guinea and the Solo-

mons provided by Fred Parker; 69 South Pacific specimens from Brigham Young University; 47 from Australia which the Australian Museum sent; and 44 specimens which Borys Malkin collected in Peru. Other large collections were received but as yet are not accessioned.

The research collections were used extensively during the year by scientists and students studying the specimens



Dr. William N. Eschmeyer, Assistant Curator of Ichthyology, has joined the staff and is in charge of the project to move the Vanderbilt collection of fishes to the Academy.



Dr. Alan E. Leviton watched  
Karl H. Switak and  
Robert P. Dempster extract  
venom for electrophoretic  
studies of venom proteins.



at the Academy, and requesting specimens to be sent them on loan. There were 46 active loans of 1221 specimens during the year. One Stanford doctoral candidate completed his research under Dr. Leviton's direction, while another student from San Francisco State College worked on his Master's problem.

Staff research projects continued to center about the herpetology of Southwest Asia. Specifically, Leviton and Anderson completed work on the "Trucial Coast Collection" of Field Associate John Gasperetti, the "Afghanistan Collection" of Field Associates Mr. and Mrs. Richard J. Clark, and a review of the snakes of the genus *Lytorhynchus*. Work with several other groups of reptiles was under way, particularly the lizards of Iran by Dr. Anderson and the snakes of the Philippine Islands by Dr. Leviton.

Research Associate Malcolm Miller spent six months in Africa and Australia studying lizards and snakes in the field and arranging for the Academy to receive representative research collections from those areas. Dr. Miller completed several advanced studies on the ultrastructure of the lizard cochlea, adaptive modification and evolution of the inner ear of snakes, and microscopic structure of the peripheral nerve innervations of lizard skin.

In cooperation with the regular staff, Mr. and Mrs. Richard Clark investigated the herpetofauna of Turkey, and Mr. John Gasperetti prepared a definitive statement on the general geography of the Trucial Coast of the Persian Gulf which is being published as Part I of a two-part study

of the herpetofauna of that region.

Mrs. Charlotte Dorsey completed a catalogue of the type specimens in the department's collections on which she has been working during the past two years.

## ICHTHYOLOGY

W. I. Follett, Curator and Chairman. This was a most important year for the Department of Ichthyology. The National Science Foundation provided a grant of \$177,600 to the Academy to process and incorporate into its collection the tropical Indo-Pacific fishes accumulated by the George Vanderbilt Foundation. The term of the grant is for two years, and it includes funds for the renovation and expansion of the Department of Ichthyology in preparation for the reception of the enormous collection now stored at Stanford University. Dr. Earl S. Herald is Chief Investigator for the program, with Mr. Follett and Dr. George S. Myers, Professor of Zoology at Stanford, serving as co-investigators. Dr. William N. Eschmeyer was employed as Assistant Curator and is in charge of the project, assisted by biologist Tomio Iwamoto. Dr. Herald and others devoted much time to the proposal, which was enormously important to the future of the department and to the study of ichthyology.

During the year about 4000 specimens were accessioned by the Department of Ichthyology. Some 413 specimens were sent out on loan and identifications were made





Above, the Academy is a meeting place for scientific societies and organizations. Shown are members who attended the forty-seventh annual meeting of the American Society of Ichthyologists and Herpetologists. Right, a giant crab, a gift from the Crown Prince Akihito of Japan, was accessioned into the Invertebrate Zoology collections by Dustin Chivers.



or nomenclatorial or taxonomic advice given to 80 individuals.

Mr. Follett continued his radiographic studies of the skeletons of fishes, as well as work on several ethnoichthyological projects and on the revision of the list of the fishes of California. Associate Curator Lillian J. Dempster and Research Associate Carl L. Hubbs are also deeply involved with the preparation of the list, which will be a major contribution for which there has long been need.

The large collection of fishes in the Department of Ichthyology, together with the excellent facilities of Steinhart Aquarium for keeping live fishes, make the Academy an ideal center for research in fisheries biology. Mr. Anatole S. Loukashkin continued studies of food and feeding behavior of anchovies under a contract with the California State Marine Research Committee. Other investigations were conducted for the U.S. Fish and Wildlife Service. Fisheries research contracts are coordinated by Senior Scientist Robert C. Miller.

## INVERTEBRATE ZOOLOGY

Allyn G. Smith, Chairman and Associate Curator; Robert C. Miller, Curator. Throughout the year the department's staff salaries, with the exception of those of the Curator and the Associate Curator, were provided by a National Science Foundation grant for the renovation and curatorial support of the invertebrate collections. Dr.

Charles R. Stasek, a research biologist employed under the grant for the last three years, resigned his position effective June 23, 1967, to accept an academic post with Florida State University. Technical Assistant Dustin C. Chivers was promoted to Assistant Curator, and Mr. David Cobb was given a temporary position of Technical Assistant.

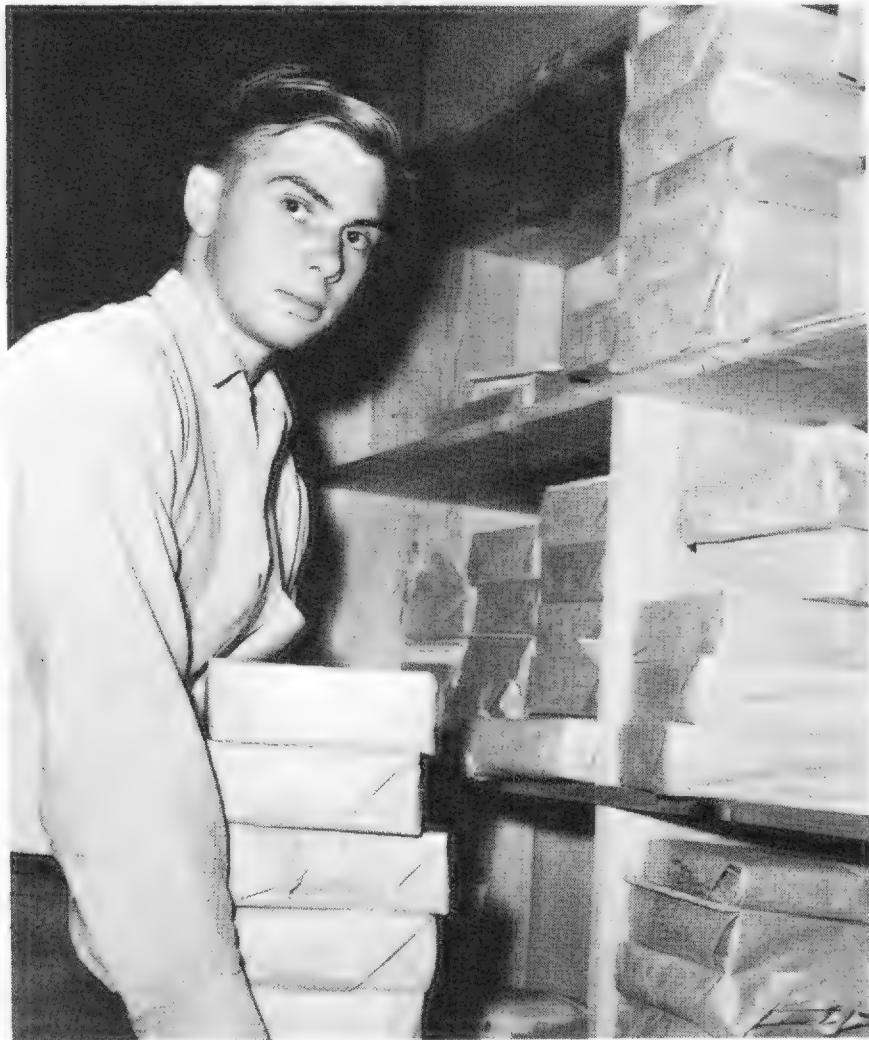
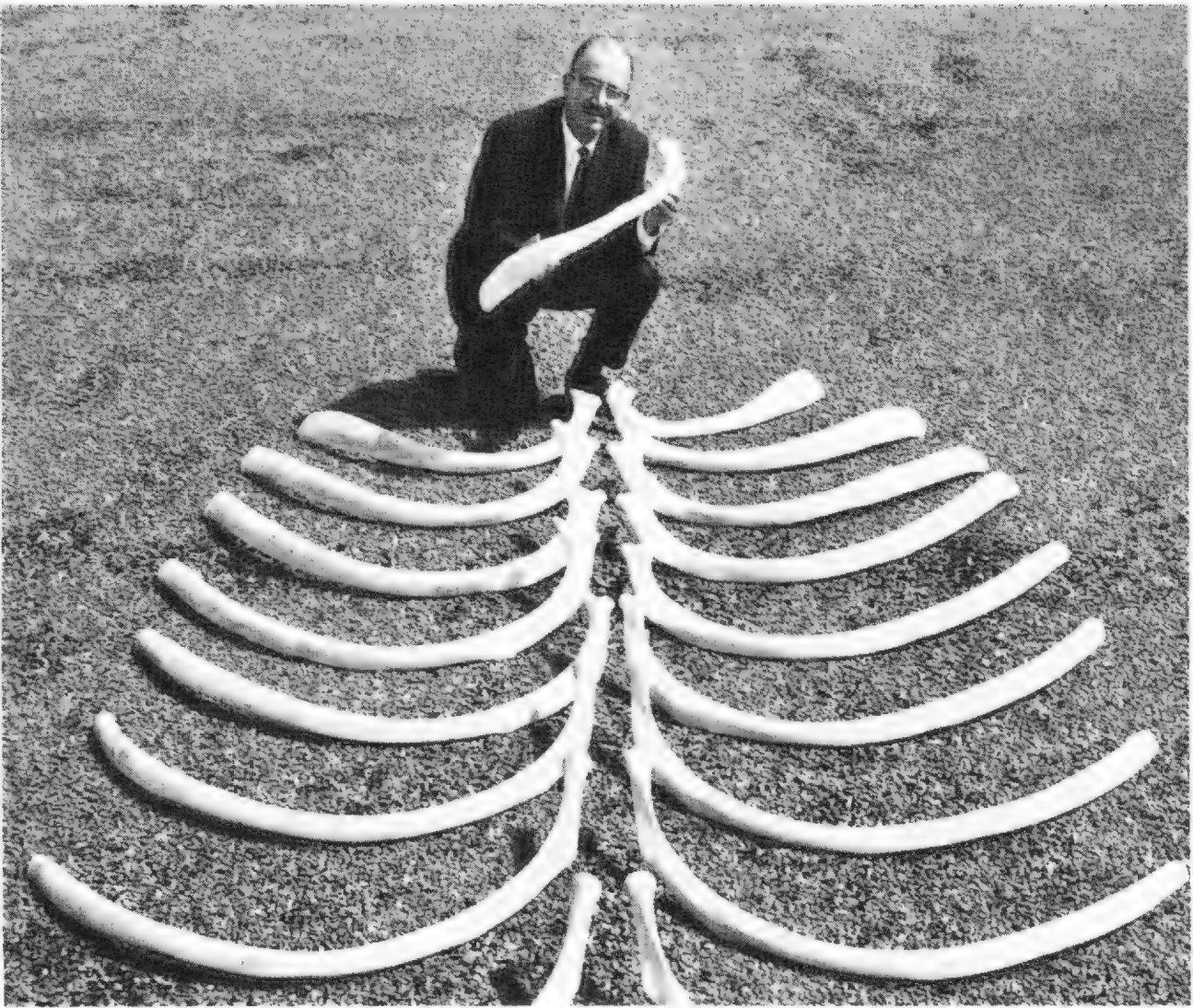
During the year some 5000 lots of organisms were accessioned into the collection, which now contains about 35,000 lots and several hundred thousand specimens. Sixty type specimens were added, bringing the Invertebrate Type Series to 364. The processing and incorporation of a large collection received from Stanford University was nearly completed. The extensive MacFarland collection of opisthobranchs was fully processed and shelved. A large series of land snails collected in the Galapagos Islands by Allyn Smith and others was reworked. The collection room and shelves were painted, and a card catalog of the specimens was completed.

The usual scientific department services of identification of organisms for individuals and institutions; the loan of specimens; and the use of the collections and library by graduate students were provided.

The National Science Foundation grant, which will expire in October 1967, has made possible this important research facility and has insured the proper preservation and future availability of irreplaceable material formerly held in the collections of the University of California, Stanford University, and other institutions and individuals.



Right, Associate Director Robert T. Orr with ribs of a young California gray whale. The skeleton will be prepared for a future exhibit. Below, Mrs. Jacqueline Schonewald, Technical Assistant in the Department of Ornithology and Mammalogy, prepared the skeleton of a Malayan tapir for the research collections.



The storage and distribution of tons of Academy scientific publications occupied Robert Bjorkland throughout the summer.

## ORNITHOLOGY AND MAMMALOLOGY

Robert T. Orr, Chairman and Curator. One hundred and three birds and 151 mammals were added to the collections. Many of these were collected in Mexico by Luis Baptista, a graduate student of the University of San Francisco who was studying for his M.A. degree under Dr. Orr. Mr. Albert Beck of the Hooper Foundation for Medical Research at Kuala Lumpur sent an important collection of Malaysian mammals. A special accession was an outstanding collection of sclerotic eye rings of birds received from Elizabeth Curtis of the University of Washington and Dr. Robert C. Miller of the Academy.

Dr. J. Dan Webster, Research Associate, spent the month of July and the first two weeks of August working with Dr. Orr on the birds of the Sierra de Miahuatlan of Oaxaca. Dr. Joseph Hall, of San Francisco State College, worked in the department for six months on a research leave to complete his report on Kaibab squirrels for the U.S. National Park Service.

Two grants were obtained from the American Association for the Advancement of Science for field work in Mexico by Luis Baptista and James A. Nee. As guests of Mr. and Mrs. Lawrence Kuebler of Chula Vista, Dr. Orr and Dr. Lindsay made a short visit to Baja California in February to photograph gray whales with their young at Scammon Lagoon.

Dr. Orr represented the Academy at the International Ornithological Congress at Oxford, England, as well as other scientific meetings in the United States. He also served as president of the Cooper Ornithological Society, and was an officer or board member of several other scientific societies.

During the year the department had 1053 visitors, 196 of them senior scientists and 385 graduate students.



Ten loans totaling 210 specimens were made to other institutions, and a great many identifications were made for various public agencies and private individuals.

Technical Assistant Jacqueline Schonewald took care of all of the material received in the flesh at the Academy, prepared a number of skulls and skeletons for the collection, worked on the identifications of a large collection of South American hummingbirds and, with Miss Joy Bailey, identified and catalogued more than 1000 specimens of birds and mammals. Miss Madelaine Waddell worked on the reference file to the bird collections, Mrs. Schonewald completed a card catalogue of the mammal collections, and Miss Muriel French went through nearly half of the cases in the bird collection, rearranging specimens and checking tray labels. Mrs. Charlotte Dorsey typed all manuscripts and correspondence, and cared for the department library and reprint collections.

Dr. Orr completed, in collaboration with Dr. Thomas C. Poulter, a manuscript entitled "Some observations on reproduction, growth, and social behavior in the Steller sea lion," continued work on "The birds of the Lake Tahoe region," and, with Mrs. Orr, completed the manuscript for a handbook on "Mushrooms and Other Fungi of Southern California." The second edition of Orr's college textbook, "Vertebrate Biology," was completed and the first published copies appeared in September.

## SCIENTIFIC PUBLICATIONS

Edward L. Kessel, Editor. The technical publications of the Academy serve as indicators of the research productivity of the institution. This year 988 pages of technical publications were published.

All manuscripts submitted for publication were screened by a committee consisting of George E. Lindsay, Edward L. Kessel and Leo G. Hertlein, and the opinions of specialists in the particular subject of the paper were usually solicited before it was accepted. The editorial staff consisted of Drs. Kessel and Hertlein, and Winifred O'Neill.

Three *Occasional Papers*, totaling 175 pages, were produced entirely at the Academy by a staff consisting of Dorothy Ludlow, Maurice Giles, and Glen S. Hayden. Color plates for both the *Occasional Papers* and *Proceedings* were printed by Dr. and Mrs. G Dallas Hanna. Twenty-three papers of the *Proceedings* contained 813 pages.

*George E. Lindsay*

GEORGE E. LINDSAY  
Director



Academy Director George E. Lindsay, President J. Wyatt Durham, and Chairman of the Board of Trustees Alan J. Galloway.



# STAFF

(As of June 30, 1967)

George E. Lindsay, *Director*

Robert T. Orr, *Associate Director*

Earl S. Herald, *Associate Director for the Aquarium*

J. Byron Warner, *Business Manager* • Vashti F. Hawley, *Secretary*

Robert C. Miller, *Senior Scientist*

## AQUATIC BIOLOGY (STEINHART AQUARIUM)

Earl S. Herald, *Associate Director for the Aquarium*

Robert P. Dempster, *Assistant Superintendent*

Glenn E. Burghardt, *Senior Aquatic Biologist*

Lloyd Gomez, *Aquatic Biologist*

Fred L. Jenne, *Aquatic Biologist*

Dennis Sullivan, *Aquatic Biologist*

Karl H. Switak, *Aquatic Biologist (herpetologist)*

Norval J. Green, *Senior Aquarist*

James V. Crew, *Aquarist*

Louis Garabaldi, *Aquarist*

Frederick W. Herms, *Aquarist*

W. Walter Schneebeil, *Aquatic Collector*

Willett J. Brown, *Aquarium Exhibits Preparator*

Phyllis J. Ensrud, *Secretary*

Fredric Frye, *Research Associate*

Marjorie Hunt, *Research Associate*

John Mizelle, *Research Associate*

Ben W. Papermaster, *Research Associate*

J. Richard Skahen, *Research Associate*

## ASTRONOMY (MORRISON PLANETARIUM)

Michael A. Bennett, *Acting Manager*

Ronald J. Daher, *Assistant Manager*

Steven B. Craig, *Chief Technician*

John H. Leonberger, *Technician*

Lysbeth Fritz, *Secretary*

David W. Todd, Jr., *Instructor*

Hubert J. Bernhard, *Lecturer*

Charles F. Hagar, *Lecturer*

Chance Massaro, *Lecturer*

Thomas A. McDonough, *Lecturer*

Harold E. Rolph, Jr., *Lecturer*

Gary Rowan, *Projectionist*

Jill Carson, *Cashier*

Margaret M. Kerwin, *Cashier*

Gloria Thompson, *Cashier*

Thomas A. Dawson, *Usher*

George D. Hood, *Usher*

Agusto Ng, *Usher*

John P. Probst III, *Usher*

Scott Schiechl, *Usher*

Robert A. Yager, *Usher*

Clay P. Butler, *Research Associate*

## BOTANY

John Thomas Howell, *Chairman and Curator*

Elizabeth McClintock, *Associate Curator*

Ira L. Wiggins, *Senior Research Botanist\**

Duncan M. Porter, *Research Botanist\**

Virginia Moore, *Technical Assistant (part-time)*

Blanche Clear, *Assistant (part-time)*

Anita Noldeke, *Assistant (part-time)*

Sallie Norwald, *Assistant (part-time)*

Mrs. Clare B. Hardham, *Research Associate*

Robert F. Hoover, *Research Associate*

Hans Leschke, *Research Associate*

Henry M. Pollard, *Research Associate*

Lewis S. Rose, *Research Associate*

Gordon H. True, *Research Associate*

Ernest C. Twisselmann, *Research Associate*

Beatrice E. Howitt, *Field Associate*

## ENTOMOLOGY

Edward S. Ross, *Chairman and Curator*

Paul H. Arnaud, Jr., *Associate Curator*

Edward L. Kessel, *Associate Curator*

Hugh B. Leech, *Associate Curator*

John W. Green, *Scientific Assistant*

Thomas W. Davies, *Technician (part-time)*

Joseph L. Fisher, *Technician (temporary)*

Stella E. Tatro, *Secretary*

Harriet E. Frizzell, *Research Associate*

J. Linsley Gressitt, *Research Associate*

Hartford H. Keifer, *Research Associate*

E. Gorton Linsley, *Research Associate*

Robert L. Usinger, *Research Associate*

Joseph Wilcox, *Research Associate*

Francis X. Williams, *Research Associate*

## EXHIBITS

Mearl F. Carson, *Chairman and Curator*

Timothy J. O'Leary, *Assistant Curator*

Ernest R. Rook, *Artist*

Charles E. Dornbach, *Senior Assistant*

Jean Pitts, *Assistant*

Fred Thompson, *Assistant*

Ansel E. Adams, *Research Associate*

## GEOLOGY

G Dallas Hanna, *Chairman and Curator*

Leo G. Hertlein, *Curator of Invertebrate Paleontology*

Virginia M. Neff, *Secretary (part-time)*

Winifred O'Neill, *Secretary (part-time)*

A. L. Brigger, *Research Associate*

Charles W. Chesterman,

*Research Associate and Honorary Curator of Minerals*

Clifford C. Church, *Research Associate*

Allan J. Galloway, *Research Associate*

## HERPETOLOGY

Alan E. Leviton, *Chairman and Curator*

Steven C. Anderson, *Assistant Curator*

James S. Dunn, *Curatorial Assistant*



Charlotte H. Dorsey, *Secretary (part-time)*  
 Benjamin H. Banta, *Research Associate*  
 James R. Dixon, *Research Associate*  
 David O. Jameson, *Research Associate*  
 Malcolm R. Miller, *Research Associate*  
 George S. Myers, *Research Associate*  
 Lawrence S. Swan, *Research Associate*  
 Erica Clark, *Field Associate*  
 Richard Clark, *Field Associate*  
 John Gasperetti, *Field Associate*

#### HOROLOGY

Bruce A. Kock, *Honorary Curator*

#### ICHTHYOLOGY

W. I. Follett, *Chairman and Curator*  
 Lillian J. Dempster, *Associate Curator*  
 William N. Eschmeyer, *Assistant Curator\**  
 Tomio Iwamoto, *Technical Assistant\**  
 Anatole S. Loukashkin, *Research Biologist*  
 Carl L. Hubbs, *Research Associate*  
 George S. Myers, *Research Associate*

#### INSTRUMENT AND CARPENTER SHOP

Alvin C. Gundred, *Superintendent*  
 A. S. Getten, *Instrument Designer*  
 Frank M. Talbert, *Machinist*  
 Peter P. Tebneff, *Chief Installer*  
 Konstantin Kurkin, *Cabinetmaker*  
 Frank Ramirez, *Electrician*  
 Uldarico Gontenas, *Assistant Installer*

#### INVERTEBRATE ZOOLOGY

Allyn G. Smith, *Chairman and Associate Curator*  
 Robert C. Miller, *Curator*  
 Dustin D. Chivers, *Assistant Curator\**  
 David A. Cobb, *Technical Assistant\**  
 Sandra I. Diehl, *Stenographer\**  
 Francis P. Filice, *Research Associate*  
 Joel W. Hedgpeth, *Research Associate*  
 A. Myra Keen, *Research Associate*  
 Franz B. Steiner, *Field Associate*  
 Robert R. Talmadge, *Field Associate*

#### LIBRARY

Ray Brian, *Librarian*  
 Clara C. Gross, *Assistant Librarian (part-time)*  
 Esme M. Segel, *Assistant Librarian*  
 Miriam Barnett, *Library Assistant (part-time)*  
 Mary Stilwell, *Library Assistant*  
 Alice E. Gillogley, *Student Assistant*  
 Peter Shapiro, *Student Assistant*  
 Julian Arntz, *Library Associate*  
 Margaret W. Campbell, *Library Associate*  
 Anson Herrick, *Library Associate*

#### MAINTENANCE AND OPERATING

William L. Denevi, *Chief Stationary Engineer*  
 George F. Murphy, *Senior Stationary Engineer*  
 Andrew J. Bell, *Stationary Engineer*  
 Ralph Clemens, *Stationary Engineer*  
 Albert Kravitz, *Stationary Engineer*  
 Mario C. Rea, *Stationary Engineer*  
 John E. Weaver, *Stationary Engineer*  
 John T. Phillips, *Museum Guard*

Frank Rogers, *Museum Guard*  
 Joseph A. Gomez, *Janitor Sub-foreman*  
 Rachel Worthery  
 Louis M. Blakely  
 Nathan C. Cole  
 Bernard Conlon  
 James Jackson, Jr.  
 Eugenio Luis  
 Clenny J. Thierry

#### OFFICE

Paul G. Brislawn, *Accountant*  
 E. Sue Weaver, *Membership Coordinator*  
 Marian Ganapol, *Membership Secretary (part-time)*  
 Dorothy N. Lohmeyer, *PBX Receptionist*  
 Olive T. Lucich, *Assistant Bookkeeper*  
 Carol A. McMillan, *Stenographer*

#### ORNITHOLOGY AND MAMMALOLOGY

Robert T. Orr, *Chairman and Curator*  
 Jacqueline Schonewald, *Technical Assistant*  
 Charlotte H. Dorsey, *Secretary (part-time)*  
 Robert I. Bowman, *Research Associate*  
 Anatole S. Loukashkin, *Research Associate*  
 Dorcas E. MacClintock, *Research Associate*  
 J. Stuart Rowley, *Research Associate*  
 Walter A. Sheppe, *Research Associate*  
 J. Dan Webster, *Research Associate*  
 Raymond Bandar, *Field Associate*

#### PACIFIC DISCOVERY

Bruce Finson, *Editor*  
 Johan Kooy, *Art Director*

#### PHOTOGRAPHY

Maurice C. Giles

#### PICTURE COLLECTION

Johan C. Kooy, *Chairman*  
 Paul Anderson, *Associate*  
 Muriel French, *Associate*

#### PUBLIC INFORMATION

Hal Richardson

#### SALES — INFORMATION

Edna Abbott  
 Vera E. Bullis  
 Ruth T. Bush  
 Erna D. Geils  
 Lilian I. Grainger  
 Marion S. Kellogg  
 Marion Mortenson  
 Maj O'Reilly  
 Fay Read  
 Greta Traub  
 Irene Williams

#### SCIENTIFIC PUBLICATIONS

Edward L. Kessel, *Editor*  
 Winifred S. O'Neill, *Editorial Assistant (part-time)*  
 Glen S. Hayden

#### JUNIOR ACADEMY

Ken Lucas, *Supervisor*  
 Darrel McKenzie, *Instructor (part-time)*

\*Positions supported by National  
 Science Foundation grants



# STAFF PUBLICATIONS

ALLISON, EDWIN C., and L. G. HERTLEIN  
(See: Hertlein and Allison)

ANDERSON, STEVEN C.

- 1966 A substitute name for *Agama persica* Blandford. *Herpetologica*, vol. 22, p. 230.  
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The Academy, in some ways, resembles an iceberg — about one-quarter is visible and the remainder is invisible to the public, i.e., the scientific research activities for which the Academy exists and from which California, the nation and the world benefits. A large portion of this essential scientific work is made possible through the generous support received from many business organizations, foundations and individuals. To one and all we express our gratitude. Business organizations and foundations that have been supporting the Academy during the past few years include:

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Ford Motor Company  
Fremont Foundation (Del Monte Corporation)  
Friden, Inc.  
Friedman (Jennie) Foundation  
Fromm & Sichel, Inc.  
Fuller (Delmarie) Fund  
Fuller Foundation  
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Gray (N.) & Co.  
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CALIFORNIA ACADEMY OF SCIENCES

FUND BALANCE SHEETS, JUNE 30, 1967 AND 1966

| ASSETS                                                                                                                      | LIABILITIES AND FUND BALANCES |             |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------|
|                                                                                                                             | 1967                          | 1966        |
| OPERATING FUNDS                                                                                                             |                               |             |
| Cash . . . . .                                                                                                              | \$ 78,703                     | \$ 57,382   |
| Receivables                                                                                                                 |                               |             |
| Grants . . . . .                                                                                                            | 233,047                       | 50,489      |
| Other . . . . .                                                                                                             | 15,591                        | 24,419      |
|                                                                                                                             | 248,638                       | 74,908      |
| Inventory of books, cards and other items,<br>at cost . . . . .                                                             | 10,777                        | 9,994       |
| Unamortized lease cost (lease expires in<br>1984) . . . . .                                                                 | 11,795                        | 12,483      |
|                                                                                                                             | \$ 349,913                    | \$ 154,767  |
| ENDOWMENT AND SPECIAL PURPOSE FUNDS                                                                                         |                               |             |
| Cash . . . . .                                                                                                              | \$ 54,270                     | \$ 49,457   |
| Savings account deposits . . . . .                                                                                          | 66,423                        | 46,266      |
| Due from operating fund . . . . .                                                                                           | —                             | 254,000     |
| Investment fund, special purposes                                                                                           |                               |             |
| Securities, at cost (market value<br>1967—\$424,348; 1966—\$411,723) . . . . .                                              | 371,715                       | 350,444     |
| Trust savings account . . . . .                                                                                             | 219                           | 390         |
|                                                                                                                             | 371,934                       | 350,834     |
| Investment fund, endowment (pledged)<br>Securities, at cost (market value 1967—<br>\$1,545,504; 1966—\$1,366,093) . . . . . | 1,391,065                     | 1,267,193   |
| Trust savings account . . . . .                                                                                             | 1,647                         | 118,832     |
|                                                                                                                             | 1,392,712                     | 1,386,025   |
| Commercial building                                                                                                         |                               |             |
| Land, at cost (building costing \$516,819<br>is fully depreciated) . . . . .                                                | 608,083                       | 608,083     |
|                                                                                                                             | \$2,493,422                   | \$2,694,665 |
| FIXED ASSETS                                                                                                                |                               |             |
| Collections, library and equipment, at cost . . . . .                                                                       | \$ 958,984                    | \$ 949,980  |
|                                                                                                                             | \$ 958,984                    | \$ 949,980  |

California Academy of Sciences  
San Francisco, California

We have examined the fund balance sheets of the California Academy of Sciences, as of June 30, 1967 and the related statement of general operations and statement of changes in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying fund balance sheets and the related statement of general operations and statement of changes in fund balances present fairly the financial position of the California Academy of Sciences at June 30, 1967, and the results of its activities for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

L. H. PENNEY & Co.  
San Francisco, California  
August 11, 1967



CALIFORNIA ACADEMY OF SCIENCES

STATEMENT OF GENERAL OPERATIONS  
FOR THE YEARS ENDED JUNE 30, 1967 AND 1966

31

| INCOME                                                                            | 1967      | 1966      |
|-----------------------------------------------------------------------------------|-----------|-----------|
| General                                                                           |           |           |
| Membership dues . . . . .                                                         | \$ 42,279 | \$ 39,526 |
| Pacific Discovery . . . . .                                                       | 8,494     | 10,598    |
| Rent from Commercial Building . . . . .                                           | 158,789   | 130,166   |
| Contributions, income from endowments<br>and from special purpose funds . . . . . | 104,148   | 108,031   |
| Grants for contract research . . . . .                                            | 114,808   | 126,549   |
| Public operations                                                                 |           |           |
| City and County of San Francisco                                                  |           |           |
| Steinhart Aquarium . . . . .                                                      | 168,509   | 153,914   |
| Museum activities . . . . .                                                       | 96,236    | 88,866    |
| Civil Service salaries . . . . .                                                  | 192,042   | 177,787   |
| Contributory activities                                                           |           |           |
| Planetarium and instrument shop . . . . .                                         | 147,689   | 136,230   |
| Television . . . . .                                                              | 29,055    | 54,498    |
| Counter sales . . . . .                                                           | 100,349   | 89,400    |
| Rental, snack bar and miscellaneous . . . . .                                     | 68,201    | 63,205    |
| Totals . . . . .                                                                  | 1,230,599 | 1,178,770 |
| EXPENDITURES                                                                      |           |           |
| Public operations                                                                 |           |           |
| Steinhart Aquarium . . . . .                                                      | 168,509   | 153,914   |
| Museum activities . . . . .                                                       | 109,690   | 101,727   |
| Civil Service salaries . . . . .                                                  | 192,042   | 177,787   |
| Contributory activities                                                           |           |           |
| Planetarium and instrument shop . . . . .                                         | 92,872    | 89,319    |
| Television . . . . .                                                              | 13,268    | 53,922    |
| Cost of sales . . . . .                                                           | 79,371    | 69,445    |
| Scientific research and curatorial activities                                     |           |           |
| Aquatic biology . . . . .                                                         | 17,468    | 41,015    |
| Botany . . . . .                                                                  | 55,701    | 28,898    |
| Entomology . . . . .                                                              | 51,477    | 46,634    |
| Geology . . . . .                                                                 | 25,659    | 19,862    |
| Herpetology . . . . .                                                             | 24,520    | 21,615    |
| Ichthyology . . . . .                                                             | 13,493    | 9,616     |
| Invertebrate zoology . . . . .                                                    | 35,338    | 34,368    |
| Ornithology and mammalogy . . . . .                                               | 18,994    | 16,451    |
| Library . . . . .                                                                 | 31,415    | 29,304    |
| Publications . . . . .                                                            | 32,730    | 27,531    |
| Other research . . . . .                                                          | 12,643    | 39,052    |
| Administrative and general . . . . .                                              | 212,913   | 184,323   |
| Contributions to employees' pension annuity . . . . .                             | 11,788    | 12,908    |
| Interest . . . . .                                                                | 12,297    | 10,646    |
| Totals . . . . .                                                                  | 1,212,188 | 1,168,337 |
| EXCESS OF INCOME OVER EXPENDITURES . . . . .                                      | \$ 18,411 | \$ 10,433 |



CALIFORNIA ACADEMY OF SCIENCES

STATEMENT OF CHANGES IN FUND BALANCES FOR THE YEAR ENDED JUNE 30, 1967

|                                                                                          | Operating funds |                               | Endowment and special purpose funds |                 |             | Fixed assets |
|------------------------------------------------------------------------------------------|-----------------|-------------------------------|-------------------------------------|-----------------|-------------|--------------|
|                                                                                          | Unrestricted    | Contract research, restricted | Plant additions                     | Special purpose | Endowment   |              |
| Balances (deficit), June 30, 1966                                                        | (\$162,307)     | \$ 62,986                     | \$25,373                            | \$421,183       | \$2,038,109 | \$949,980    |
| Additions (deductions)                                                                   |                 |                               |                                     |                 |             |              |
| Cancellation of indebtedness due the endowment fund from the unrestricted operating fund | 254,000         |                               |                                     |                 | ( 254,000)  |              |
| Gifts, bequests and grants received                                                      |                 |                               | 7,000                               | 27,529          | 4,813       |              |
| Income from investments                                                                  |                 |                               | 1,022                               | 18,956          | 59,053      |              |
| Net gain on sale of securities                                                           |                 |                               |                                     |                 | 44          |              |
| Other receipts                                                                           |                 |                               |                                     | 2,846           | 4,150       |              |
| Additions to library                                                                     |                 |                               | ( 19)                               | ( 13,584)       |             | 9,004        |
| Expenditures for special purposes                                                        |                 |                               |                                     |                 | ( 59,053)   |              |
| Appropriation of funds to general income                                                 |                 |                               |                                     |                 |             |              |
| Excess of income and appropriations over operating expenditures                          | 18,411          |                               |                                     |                 |             |              |
| Excess of contract research income over restricted expenditures                          |                 | 175,773                       |                                     |                 |             |              |
| Net additions (deductions)                                                               | 272,411         | 175,773                       | 8,003                               | 35,747          | ( 244,993)  | 9,004        |
| Balances, June 30, 1967                                                                  | \$110,104       | \$238,759                     | \$33,376                            | \$456,930       | \$1,793,116 | \$958,984    |

The accompanying notes are an integral part of the financial statements.

NOTES TO FINANCIAL STATEMENTS, JUNE 30, 1967

1. Fixed Assets

Buildings located in Golden Gate Park carried at \$2,354,362 are not included in fixed assets as title to buildings is vested in the City and County of San Francisco.
2. Interfund Debt

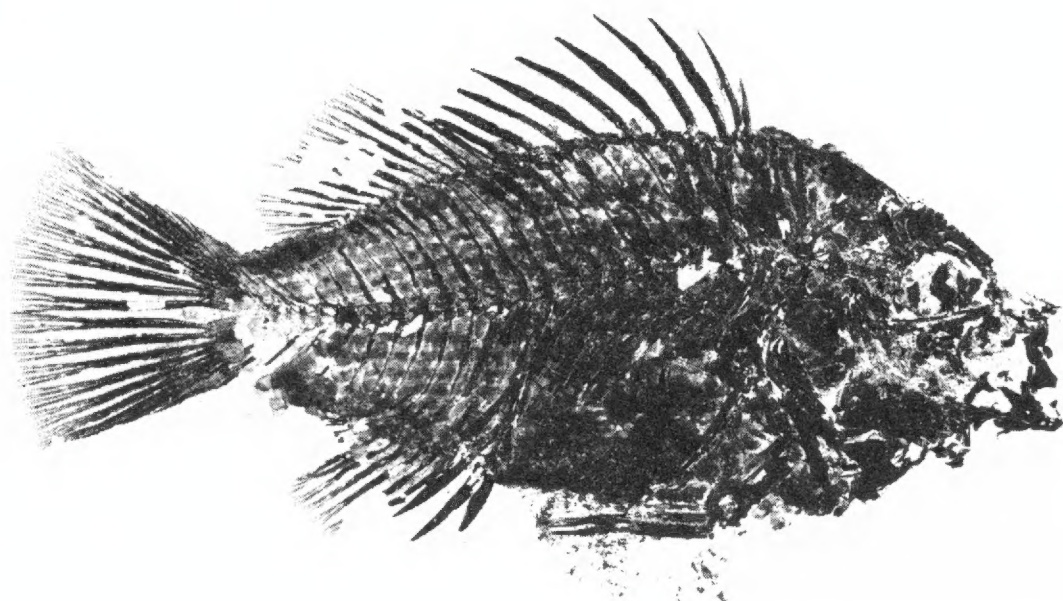
During the fiscal year, the Board of Trustees approved cancellation of the \$254,000 advance from the endowment fund to the unrestricted operating fund.
3. Note Payable

Securities held in trust for the endowment fund are pledged as collateral for the note payable to a bank. The note matures September 22, 1967, with interest thereon at the rate of 6% per annum payable monthly.
4. Litigation Pending

The Academy, in 1964, brought a lawsuit against J. B. Wilson and RSS Corporation for monies due on the sale and servicing of syndicated television programs in the approximate amount of \$75,000.
5. Accounting Method

The California Academy of Sciences has established the practice of recording gifts and bequests only when received.





## SPECIAL GIFTS AND BEQUESTS

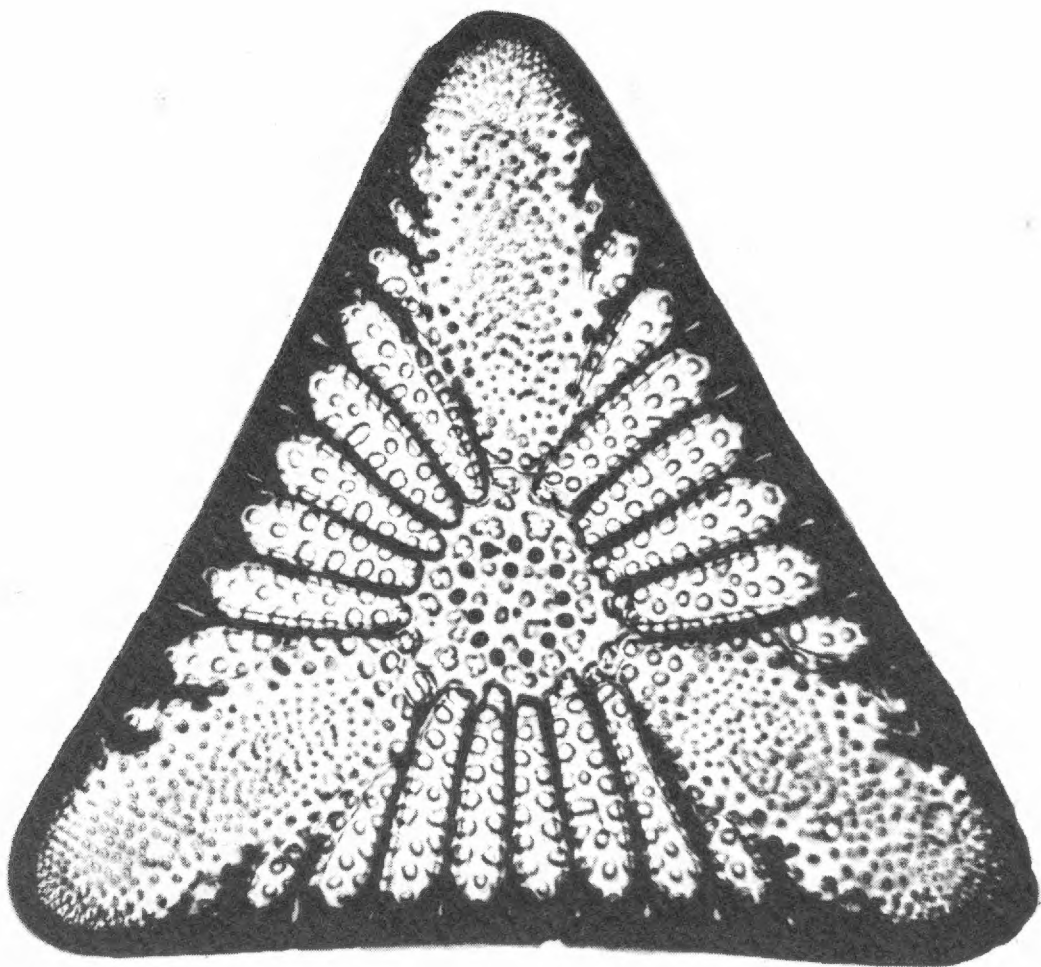
The Academy's various buildings — Steinhart Aquarium, Simson African Hall, Morrison Auditorium and Planetarium, North American Hall, Mailliard Library, Science Museums, and now Cowell Hall — were built as results of gifts and bequests.

Another hidden "building" has been going on over the years, the building of an Endowment Fund which provides income to pay salaries, purchase research supplies and broaden the Academy's scientific and educational program. Without it the Academy could not function. The Endowment Fund must be increased to meet pressing current and future needs.

Truman B. Douglas said: "Through the instrument of money we have been given a marvelous power to continue our influence, our values, our convictions and dedications long after we are gone. The act of deciding what to do with one's money after one's need of it is finished is one of the momentous events of life."

Through a bequest to the Academy you can insure the perpetual productive use of some of your assets. You may want to consider the Academy Endowment Fund when making your annual gifts or to provide for a bequest in your will. For details as to needs or how to make such a gift or bequest, may we suggest you contact the Director of the Academy, any of its Trustees, or your own lawyer.





CALIFORNIA ACADEMY OF SCIENCES  
GOLDEN GATE PARK, SAN FRANCISCO, CALIFORNIA 94118